

FSB (Subject-Specific Provisions) for the Master of Science Degree Programme in eXtended Artificial Intelligence (xtAI) (120 ECTS credits)

at Julius-Maximilians-Universität Würzburg

of 16.09.2020

While we have made every effort to ensure that all the information provided in this document is accurate and up to date, we do not warrant its accuracy, correctness or completeness. The English text in this document is intended solely as a convenience to non-German-reading students and staff members. Any discrepancies or differences that may arise in the translation of the official German version shall not be legally binding. In the event of a conflict between the information provided here and the information provided in the official publications of the University of Würzburg, the official publications shall prevail.

Article 13 Subarticle 1 Sentence 2 in conjunction with Article 58 Subarticle 1 and Article 61 Subarticle 2 Sentence 1 *Bayerisches Hochschulgesetz* (Bavarian Higher Education Act, BayHSchG) dated 23 May 2006 (*Bayerisches Gesetz- und Verordnungsblatt* (Bavarian Law and Ordinance Gazette, GVBl, p. 245, *Bayerische Rechtssammlung* (Collection of Bavarian Laws, BayRS) 2210-1-1-WFK) as amended from time to time forms the framework for the following subject-specific provisions decreed by Julius-Maximilians-Universität Würzburg.

Contents

Part 1: General Provisions	2
Section 1 Scope	2
Section 2 Aims and Objectives of the Degree Programme, Learning Outcomes	2
Section 3 Start, Structure and Standard Length of Programme	2
Section 4 Prerequisites for Admission to the Programme, Recommended Fundamental Knowledge and Skills	3
Section 5 Minimum ECTS Score Requirement.....	5
Section 6 Examination Committee	5
Part 2: Assessments	5
Section 7 Other Subject-Specific Assessments	5
Section 8 Area of Degree Finalisation: Master's Thesis and Master's Defence	5
Section 9 Overall Grade, Grade in Degree Subject and Grades Awarded for Individual Areas	5
Part 3: Final Provisions	6
Section 10 Entry into Force	6
Appendix Aptitude Assessment Procedure	7
Section 1 Purpose of the Aptitude Assessment Procedure.....	7
Section 2 Aptitude Assessment Procedure.....	7
Section 3 Aptitude Assessment Panel.....	8
Section 4 Admission to the Aptitude Assessment Procedure, Scale and Content of the Aptitude Assessment Procedure, Establishment and Announcement of the Result, Minutes.....	8
Appendix SFB	10

Part 1: General Provisions

Section 1 Scope

These subject-specific provisions (FSB) shall supplement the ASPO (General Academic and Examination Regulations) for the Bachelor's and Master's Degree Programmes Offered by Julius-Maximilians-Universität Würzburg (JMU) dated 1 July 2015 as amended from time to time.

Section 2 Aims and Objectives of the Degree Programme, Learning Outcomes

¹The eXtended Artificial Intelligence programme (hereinafter: xtAI) is offered by the Faculty of Mathematics and Computer Science at JMU as a research-based course leading to the degree of Master of Science (MSc). ²The programme is conducted entirely in English. ³The MSc in xtAI teaches students advanced skills and competences for the analysis, development and evaluation of artificial intelligence (AI) systems. ⁴A special focus of students' training is hybrid intelligence systems at the interface between artificial and human intelligence. ⁵State-of-the-art methods in the area of X reality (virtual, mixed and augmented reality) broaden the spectrum of AI methods, allow the testing of alternative AI approaches and leverage synergies between humans and computers as an area of application for collaborative and user-friendly AI.

Section 3 Start, Structure and Standard Length of Programme

(1) By way of derogation from Section 7 ASPO, the MSc in xtAI offers winter intake only.

(2) ¹The programme is structured as follows:

<i>Area or sub-area</i>	<i>ECTS credits</i>	
Mandatory courses	30	
Mandatory electives	60	
xtAI Seminars		min. 5 max. 10
Core AI Methods		min. 10 max. 35
Core XR Methods		min. 10 max. 20
xtAI Application & Technologies		min. 10 max. 25
Computer Science		min. 0 max. 10
Area of degree finalisation	30	
<i>Total</i>	120	

²Within the framework of the mandatory electives, students must successfully complete modules with graded assessments on a scale totalling at least 30 ECTS credits; it is thereby immaterial how the graded modules are distributed across the individual sub-areas, but students must in any case earn the ECTS points prescribed in the respective sub-areas.

(3) The standard length of programme for the xtAI Master's programme shall be four semesters, in which students shall earn a total of 120 ECTS credits.

Section 4 Prerequisites for Admission to the Programme, Recommended Fundamental Knowledge and Skills

(1) ¹Admission to the xtAI Master's programme requires the following (all conditions to be met cumulatively):

- a) A Bachelor's degree (180 ECTS credits) completed at JMU or another higher education institution in Germany or abroad or an equivalent German or foreign qualification (e.g. State Examination), and
- b) Proof of competences acquired in the following areas aa) to cc) on the respective minimum scale (as a rule acquired in the framework of one of the first degrees indicated under Letter a)), according to the ECTS credits scheme used at JMU for these Bachelor's programmes):
 - aa) Competences on a scale of at least 20 ECTS credits or – in the case of programmes not modularised within the meaning of the ECTS – competences on a corresponding scale in the field of mathematics, as a rule acquired in the framework of one of the first degrees indicated under Letter a) (according to the ECTS credits scheme used at JMU for the BSc in Mathematics), and
 - bb) Competences on a scale of at least a further 80 ECTS credits or – in the case of programmes not modularised within the meaning of the ECTS – competences on a corresponding scale in the field of computer science, and
 - cc) Competences acquired in the framework of a thesis on a scale of at least 10 ECTS credits on a topic from the field of computer science, according to the ECTS credits scheme used at JMU for the BSc in Computer Science.

The required competences are taught, for example, in the framework of the following programmes at JMU which lead to the degree of Bachelor of Science: Computer Science, Games Engineering, Aerospace Informatics, Mathematics, Business Mathematics, Business Information Systems (in this case with a corresponding area of specialisation in the mandatory electives) and Human-Computer Interaction (180 ECTS credits),

- c) Suitable proof of English language proficiency to at least Level B2 of the Common European Framework of Reference for Languages (CEFR), for example:
 - aa) Test of English as a Foreign Language (TOEFL) with at least 72 internet-based TOEFL points, or
 - bb) International English Language Test System (IELTS) with a result of 6.0 or higher, or
 - aa) Cambridge First Certificate in English (FCE), or
 - bb) A grade in English of at least 'Satisfactory' (*befriedigend*; equivalent to at least 7 out of 15 points) as part of a German higher education entrance qualification or
 A foreign higher education entrance qualification with proof of English language proficiency which is at least equivalent to the above-mentioned higher education entrance qualification, or
 - ee) Proof that training (in particular in the framework of the first degree indicated under Letter a)) has already been completed with English language skills on the level specified in aa) to dd),

- d) Proof of aptitude for the xtAI Master's programme furnished in the framework of an aptitude assessment procedure (cf. Appendix 'Aptitude Assessment Procedure').

²The aptitude assessment panel (cf. Appendix 'Aptitude Assessment Procedure') shall decide on the fulfilment of the requirements in accordance with Sentence 1 Letter a) and whether the criteria regarding the minimum subject-related competences (Sentence 1 Letter b)) and language skills (Sentence 1 Letter c)) are met. ³When deciding on the equivalence of first degrees with the above-mentioned reference qualification as well as for verifying the required minimum competences and their scale (in particular in the case of non-modularised programmes), the principle of reverse burden of proof and the obligation to establish equivalence shall apply in accordance with Article 63 *Bayerisches Hochschulgesetz* (Bavarian Higher Education Act, BayHSchG), insofar as there are no significant differences with regard to the competences (learning outcomes) acquired.

(2) ¹In the event that the requirements set out in Subsection 1 Sentence 1 Letter a) and/or b) and/or c) are not met, admission to the xtAI Master's programme shall not be possible. ²In this case, applicants shall receive corresponding notification stating the reasons for the decision and instructions on the available legal remedies, unless admission to the Master's programme may be possible in accordance with Subsection 4 if the requirements indicated in Subsection 1 Sentence 1 Letter a) are not met.

(3) ¹If the requirements set out in Subsection 1 Letter a), b) and c) are met, the applicant shall be admitted to an aptitude assessment procedure (cf. Appendix 'Aptitude Assessment Procedure'). ²Applicants who complete the aptitude assessment procedure successfully shall be entitled to commence the xtAI Master's programme at JMU, as long as the requirements for this programme do not substantially change. ³Applicants who do not complete the aptitude assessment procedure successfully shall receive notification stating the reasons for the decision and instructions on the available legal remedies. ⁴Applicants may repeat the failed aptitude assessment procedure for the xtAI programme once.

(4) ¹In order to facilitate an uninterrupted transition from a first degree, in particular a Bachelor's degree, to the Master's programme, applicants who are not yet able to produce corresponding proof of the degree required in accordance with Subsection 1 Sentence 1 Letter a) at the time of application may be admitted to the Master's programme in the semester immediately following, subject to a resolutive condition as follows (to be met cumulatively at the time of application):

- a) Proof of at least 150 ECTS credits or – in the case of programmes not modularised within the meaning of the ECTS – academic achievements on a corresponding scale in the first degree required in accordance with Subsection 1 Sentence 1 Letter a),
- b) Proof of competences as indicated in Subsection 1 Sentence 1 Letter b) (proof that a corresponding topic was assigned for the thesis is sufficient here),
- c) Proof of English language skills as specified in Subsection 1 Sentence 1 Letter c), and
- d) Proof of aptitude for the xtAI Master's programme furnished in the framework of an aptitude assessment procedure (cf. Appendix 'Aptitude Assessment Procedure').

²In the event that the resolutive condition takes effect, i.e. that proof of the first degree specified in Subsection 1 Sentence 1 Letter a) is not produced at the latest by the end of the re-enrolment period for the third subject semester of the xtAI programme, the applicant is to be disenrolled at the end of the second subject semester.

(5) ¹Applicants who have not obtained their higher education entrance qualification or a relevant first degree at a German-speaking institution must additionally provide proof of sufficient proficiency in the German language. ²This proof must be provided in line with the specifications of JMU's Enrolment Statutes as last amended. ³For the xtAI Master's programme, proof of basic knowledge of the German language to at least Level A2 of the Common European Framework of Reference for Languages (CEFR) must be produced at the latest by the end of the first year

of study, in accordance with Section 4 Subsection 2 Sentence 4 of the Enrolment Statutes.

Section 5 Minimum ECTS Score Requirement

These FSB do not prescribe a minimum ECTS score requirement as described in Section 13 Subsection 5 ASPO.

Section 6 Examination Committee

¹In accordance with Section 14 Subsection 1 Sentence 3 ASPO, the examination committee for the xtAI programme shall comprise three members. ²The examination committee may decide to bring in additional members for consultation and advice, including, but not limited to, course advisors; these members shall be non-voting.

Part 2: Assessments

Section 7 Other Subject-Specific Assessments

(1) The following other subject-specific forms of assessment are foreseen:

(2) ¹Reports: Reports are written assessments to be compiled in private study which should demonstrate that the examinee is able to report on the contents of a course or the activities undertaken within a course (in particular a placement, project or field trip) in a structured and commensurate manner. ²Depending on the context, the term “report” can also appear in the SFB (List of Modules) as a compound term, in particular as research report, placement report, project report or field trip report.

(3) Presentations: In a presentation, examinees should demonstrate that they are capable of working scientifically on a topic assigned to them and of presenting the contents orally and, if applicable, also in written form and/or using a form of media (e.g. animation, video, poster, hand-out).

(4) Discussion: In a discussion, examinees should demonstrate that they are capable of exploring the scientific topic assigned to them in a dialogue between two or more persons and of presenting sound arguments to substantiate their position.

Section 8 Area of Degree Finalisation: Master’s Thesis and Master’s Defence

(1) ¹The Master’s thesis shall be worth 25 ECTS credits. ²The time allowed for completion of the thesis shall be six months. ³Topics shall only be assigned to examinees once they have earned at least 75 ECTS credits in the xtAI programme.

(2) The Master’s thesis shall be defended in accordance with the provisions of the SFB.

Section 9 Overall Grade, Grade in Degree Subject and Grades Awarded for Individual Areas

¹ A student’s overall grade shall be calculated in accordance with the provisions of Section 35 Subsection 1 ASPO. ²The grade for the degree subject (xtAI) shall be calculated in accordance with Section 35 Subsection 2 ASPO, the grades for the individual areas shall be calculated in accordance with Section 35 Subsection 3 to 5 ASPO.

³When calculating the grades for the mandatory electives, the “basket model” described in Section 35 Subsection 5 Sentences 7 to 9 ASPO shall apply. ⁴The grade for the mandatory electives shall thereby be calculated from the best modules with graded assessments on a scale of 50 ECTS credits.

⁵ When calculating the grade for the degree subject and the overall grade, the individual areas shall be assigned the following weight values:

<i>Area or sub-area</i>	<i>Weight value for</i>	
	<i>Grade in degree subject</i>	<i>Overall grade</i>
Mandatory courses	30/130	120/120
Mandatory electives	60/130	
xtAI Seminars		
Core AI Methods		
Core XR Methods		
xtAI Application & Technologies		
Computer Science		
Area of degree finalisation	40/130	
<i>Total</i>		

Part 3: Final Provisions

Section 10 Entry into Force

¹These FSB shall enter into force on the day following their announcement. ²They shall apply to all students enrolled in the xtAI programme that leads to the award of the degree of Master of Science (120 ECTS credits) who commence studies in that programme at JMU and whose programmes are governed by the ASPO (General Academic and Examination Regulations) for the Bachelor’s and Master’s Degree Programmes Offered by Julius-Maximilians-Universität Würzburg dated 1 July 2015 as amended from time to time.

Appendix Aptitude Assessment Procedure

¹Admission to the Master's programme shall be conditional on passing an aptitude assessment procedure. ²This shall be conducted as described below.

Section 1 Purpose of the Aptitude Assessment Procedure

¹The purpose of the aptitude assessment procedure shall be to gauge, on the basis of

1. educational background, in particular the achievements from the first degree, and
2. the subject-related and methodical skills in the areas indicated in Section 4 Subsection 1 Sentence 1 Letter b) FSB

who is qualified for the Master's degree programme. ²The aim shall be to determine whether the applicant satisfies the high requirements of the eXtended Artificial Intelligence Master's programme (hereinafter xtAI) and will be capable of conducting scientific work independently, in particular with regard to complex research and development projects. ³Qualifying for the xtAI Master's programme presupposes proof of the applicant's aptitude according to the following rules.

Section 2 Aptitude Assessment Procedure

(1) ¹The aptitude assessment procedure is conducted by the aptitude assessment panel of the xtAI programme at the Institute of Computer Science of the Faculty of Mathematics and Computer Science of JMU.

²Where possible and within the possibilities of the personnel resources available, the aptitude assessment procedure for the winter semester is conducted both in the preceding spring (spring date) as well as the preceding summer (summer date), however, at least on one of these two dates in order in particular to be able to give international applicants a prompt response regarding their aptitude for the programme, whereby participation on each of these dates counts as an attempt with regard to the number of repetitions (Section 6 Subsection 1 Sentence 8 ASPO in conjunction with Section 4 Subsection 3 Sentence 4 FSB).

(2) ¹For both the spring and summer dates, applications for admission to the xtAI programme for the following winter semester must be submitted by 15 March to the chairperson of the aptitude assessment panel (cf. Section 3) for the xtAI programme in the form and by the closing date (cut-off date) specified; in particular, an electronic application procedure via the relevant JMU websites may be foreseen here. ²Should there be reasons beyond the applicant's control, documents in accordance with Subsection 3, No. 1, Letter a) may be submitted later for both the spring and the summer date and by 31 August (cut-off date) by the latest (for the following winter semester) in order to be granted final admission to the xtAI programme. ³In the event that the applicant cannot meet the closing date (e.g. because the Bachelor's degree certificate has not yet been issued), the only remaining option is admission subject to a resolutive condition in accordance with Section 4 Subsection 4 FSB. ⁴For applications for the 2020/2021 winter semester, Sentence 1 applies, with the condition that applications for admission to the xtAI Master's programme can be submitted once up until 15 July 2020.

(3) Applications shall include:

1. Proof of academic achievements from the first degree as specified in Section 4 Subsection 1 Sentence 1 Letter a) FSB:
 - a) Proof of a university degree or an equivalent qualification (in the case of applications for final admission to the Master's programme), indicating the final grade achieved, or

- b) ¹Proof of 150 ECTS credits or – in the case of programmes not modularised within the meaning of the ECTS – academic achievements on a corresponding scale (in the case of applications for admission to the Master’s programme subject to a resolutive condition) from which the grades achieved are clear.
2. A transcript of records (overview of study and examination achievements) detailing the modules passed in the areas indicated in Section 4 Subsection 1 Sentence 1 Letter b) FSB and the examination achievements attributed to them, including the ECTS credits and grades awarded or – in the case of programmes not modularised within the meaning of the ECTS – academic achievements on a corresponding scale and, if applicable, accredited examination achievements or, in the case of applications for admission to the Master’s programme subject to a resolutive condition, a provisional overview of study and examination achievements with the details referred to above. It must above all be clear from the transcript that the applicant has acquired the competences required for the xtAI programme in accordance with Section 4 Subsection 1 Sentence 1 Letter b) FSB (in the case of an application for final admission to Master’s programme) or Section 4 Subsection 4 Sentence 1 Letter b) FSB in the case of an application for admission to the Master’s programme subject to a resolutive condition, and
3. Proof that the applicant possesses English language skills in accordance with Section 4 Subsection 1 Sentence 1 Letter c) FSB.

Section 3 Aptitude Assessment Panel

¹The aptitude assessment procedure shall be conducted by an aptitude assessment panel comprising three members. ²The chairperson of the examination committee for the xtAI programme is a member of the aptitude assessment panel and also presides over it. ³The Faculty Board of the Faculty of Mathematics and Computer Science appoints the remaining members of the aptitude assessment panel for a period of three years; reappointment is permitted. ⁴Only such persons may be appointed as members of the aptitude assessment panel who are entitled to act as higher education examiners (Article 62, *Bayerisches Hochschulgesetz* (Bavarian Higher Education Act, BayHSchG), in conjunction with the Higher Education Examiners Ordinance as last amended). ⁵The members of the aptitude assessment panel elect a deputy chairperson from among their ranks by way of simple majority.

⁶The aptitude assessment panel is quorate if its members have been summoned with due notice of three days and the majority of the members are present. ⁷In the case of elections and other decisions (especially within the aptitude assessment procedure), the panel decides by simple majority vote. ⁸In the event of a tie, the chairperson has the casting vote. ⁹In the performance of its duties, the panel may call on other persons entitled to act as higher education examiners.

Section 4 Admission to the Aptitude Assessment Procedure, Scale and Content of the Aptitude Assessment Procedure, Establishment and Announcement of the Result, Minutes

- (1) Participation in the aptitude assessment procedure presupposes, in addition to the fulfilment of the requirements in accordance with Section 4 FSB, that the documents indicated in Section 2 Subsection 3 have been submitted in full and by the due date.
- (2) There are two alternative ways to pass the aptitude assessment procedure:
1. ¹Through the first alternative, an applicant’s aptitude for the programme is established if:
 - a) The applicant passes the aptitude assessment examination to be conducted in the shape of a written test in English lasting a total of about 30 to 60 minutes (the applicant’s competences in the following areas are assessed:

- Mathematics, including statistics, linear algebra, analysis
- Computer science, including algorithms and data structures, technical and theoretical computer science, software engineering, databases
- Basic programming skills)

and

- b) On the basis of the documents submitted the applicant is particularly qualified.
²Considered as particularly qualified shall be such applicants who:

- Produce proof of having achieved a grade of 2.0 or higher in a relevant first degree (in accordance with Section 4 Subsection 1 Sentence 1 Letter a) FSB),
or
- ¹Produce proof of an average grade of 2.0 or higher in respect of the competences indicated in Section 4 Subsection 1 Sentence 1 Letter b) FSB. ²This average grade is calculated as follows: Firstly, all successfully completed and graded modules in the areas indicated in Section 4 Subsection 1 Sentence 1 Letter b) shall be ranked in tiers, starting with the best and beginning with the highest number of ECTS credits within the same tier; secondly, in the resulting sequence, modules shall be selected until the total sum of their ECTS credits reaches 80; finally, the average grade is calculated from the average weighted on the basis of ECTS credits (weighted arithmetic mean) of the grades for the individual modules used, whereby the last module included in the calculation is only weighted with the ECTS credits required to reach 80. ³The grade is calculated to one digit after the decimal point; all other digits are deleted without rounding. ⁴Should the applicant have passed modules on a scale of at least 80 ECTS credits but the proportion of modules with numerical grades be less than 80 ECTS credits, only the modules with numerical grades shall be considered.

2. ¹The second alternative can be used to determine the aptitude for the programme of applicants whose aptitude in accordance with Subsection 2 No. 1 has not yet been established due to the absence of the requirements in accordance with Subsection 2 No. 1 Letter b) if:

- a) The applicant has passed the aptitude assessment examination to be conducted in written form in accordance with Subsection 2 No. 1 Letter a),
- b) On the basis of the documents submitted the applicant is qualified as follows:
- aa) Through a relevant first degree (in accordance with Section 4 Subsection 1 Sentence 1 Letter a) FSB) with a grade of at least 2.5 or higher
or
- bb) Through an average grade of 2.5 or higher in the areas indicated in Section 4 Subsection 1 Sentence 1 Letter b) FSB. ²This average grade is calculated as follows: Firstly, all successfully completed and graded modules in the areas indicated in Section 4 Subsection 1 Sentence 1 Letter b) shall be ranked in tiers, starting with the best and beginning with the highest number of ECTS credits within the same tier; secondly, in the resulting sequence, modules shall be selected until the total sum of their ECTS credits reaches 80; finally, the average grade is calculated from the average weighted on the basis of ECTS credits (weighted arithmetic mean) of the grades for the individual modules used, whereby the last module included in the calculation is only weighted with the ECTS credits required to reach 80. ³The grade is calculated to one digit after the decimal point; all other digits are deleted without rounding. ⁴Should the applicant

have passed modules on a scale of at least 80 ECTS credits but the proportion of modules with numerical grades be less than 80 ECTS credits, only the modules with numerical grades shall be considered,

and

- c) By passing an additional examination which is conducted in the form of an individual graded oral examination in accordance with Section 31 Subsection 1 and 2 ASPO and lasts about 20 to 30 minutes. ²The purpose of the examination is to verify the applicant's following competences in the following sub-areas of xtAI, which are also indicated in Section 4 Subsection 1 Sentence 1 Letter b) FSB: Theoretical Computer Science, Practical Computer Science (algorithms and data structures, programming skills, software engineering) and Technical Computer Science (computer systems and data transmission). ³The oral examination is conducted and assessed by two persons appointed by the aptitude assessment panel. ⁴Entitled to act as examiners can be both the members of the aptitude assessment panel themselves and persons engaged in teaching who are in charge of courses within the Master's degree programme in Computer Science and authorised to administer university examinations in accordance with the HSchPrüferV (pursuant to Article 62 BayHSchG). ⁵Each examiner awards a grade in accordance with the tiers of grades prescribed in Section 31 Subsection 1 and 2 ASPO (1.0; 1.3; 1.7; ...; 3.7; 4.0; 5.0); the overall grade is calculated from the arithmetic mean of the two individual grades (to one digit after the decimal point, all other digits are deleted without rounding). ⁶Applicants have passed the oral examination if the mean of the overall grade is 4.0 or higher. ⁷The examination proceedings, including date and place of the aptitude assessment procedure, examiners' names, examinee's name, main contents of the oral examination, the examiners' assessment and the overall result, must be recorded in minutes. ⁸The minutes must be signed by the examiners.

(3) ¹Applicants shall be notified in writing of the result of the aptitude assessment procedure and, if aptitude has been established, applicants shall present the respective notification at the time of enrolment. ²Rejections shall be justified and include information on available legal remedies. ³Applicants may repeat the aptitude assessment procedure for the xtAI programme once (Section 4 Subsection 3 Sentence 4 FSB).

Appendix SFB

Appendix SFB: Studienfachbeschreibung (List of Modules) for the subject eXtended Artificial Intelligence (xtAI) leading to the degree of “Master of Science” (120 ECTS credits)

(Responsible: Institute of Computer Science)

Abbreviations used:

A = thesis, **B/NB** = (not) successfully completed, **E** = field trip, **K** = colloquium, **LV** = course(s), **NUM** = numerical grade, **O** = conversatorium, **P** = placement/lab course, **PL** = assessment(s), **R** = project, **S** = seminar, **SS** = summer semester, **SWS** = weekly contact hours, **T** = tutorial, **TN** = participants, **Ü** = exercise, **V** = lecture, **VL** = prerequisite(s), **WS** = winter semester

Remarks:

Unless otherwise stated, **courses and assessments** are held in German.

Should there be the **option to choose between several methods of assessment**, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and communicate this in the customary manner.

Should a module comprise **more than one graded assessment**, all assessments are equally weighted, unless otherwise stated below.

Should the assessment comprise **several individual assessments**, successful completion of the module requires successful completion of all individual assessments.

Unless otherwise stated, **assessments** for the modules in these SFB are offered every semester.

Abbreviation	Version	Module and sub-module(s) (German /English)	(SWS) Type of LV	ECTS credits	Duration (sem.)	TN and selection	Method of grading	Method and scale of assessment	Assessment language	Successfully completed modules	<ol style="list-style-type: none"> 1) Creditable for bonus 2) LV language 3) Assessment frequency 4) Other requirements 5) Further information on duration 6) Possible specialisations 7) Other
Mandatory courses (30 ECTS credits)											
10-xtAI=L1	2020-WS	xtAI Lab 1 xtAI Lab 1	R (3)	5	1		NUM	Project work: Report (approx. 20 pages) with presentation (30-45 min.) followed by discussion on the topic	English		<ol style="list-style-type: none"> 1) Creditable for bonus 2) English
10-xtAI=L2	2020-WS	xtAI Lab 2 xtAI Lab 2	R (6)	10	1		NUM	Project work: Report (approx. 20 pages) with presentation (30-45 min.)	English		<ol style="list-style-type: none"> 1) Creditable for bonus 2) English

								followed by discussion on the topic			
10-xtAI=L3	2020-WS	xtAI Lab 3 xtAI Lab 3	R (6)	10	1		NUM	Project work: Report (approx. 20 pages) with presentation (30-45 min.) followed by discussion on the topic	English		1) Creditable for bonus 2) English
10-xtAI=IAI	2020-WS	Introduction in AI Introduction in AI	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
Mandatory electives (60 ECTS credits)											
xtAI Seminars (min. 5 to max. 10 ECTS credits)											
10-xtAI=SEM1	2020-WS	Seminar 1 - Extended Artificial Intelligence Seminar 1 - Extended Artificial Intelligence	S (2)	5	1		NUM	Term paper (10-15 pages) and presentation (30-45 min.) followed by discussion on seminar topic	English		1) Creditable for bonus 2) English
10-xtAI=SEM2	2020-WS	Seminar 2 - Extended Artificial Intelligence Seminar 2 - Extended Artificial Intelligence	S (2)	5	1		NUM	Term paper (10-15 pages) and presentation (30-45 min.) followed by discussion on seminar topic	English		1) Creditable for bonus 2) English
Core AI Methods (mind. 10 to max. 35 ECTS credits)											
10-xtAI=DS1	2020-WS	Data Science 1 Data Science 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=DS2	2020-WS	Data Science 2 Data Science 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=ML1	2020-WS	Machine Learning 1 Machine Learning 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=ML2	2020-WS	Machine Learning 2 Machine Learning 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English

10-xtAI=NLP1	2020-WS	Natural Language Processing 1 Natural Language Processing 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=NLP2	2020-WS	Natural Language Processing 2 Natural Language Processing 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=TAI1	2020-WS	Theorie der Künstlichen Intelligenz 1 Theory of Artificial Intelligence 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=TAI2	2020-WS	Theorie der Künstlichen Intelligenz 2 Theory of Artificial Intelligence 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=CV	2020-WS	Computer Vision Computer Vision	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=AIM1	2020-WS	Selected Topics in AI Methods 1 Selected Topics in AI Methods 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=AIM2	2020-WS	Selected Topics in AI Methods 2 Selected Topics in AI Methods 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
Core XR Methods (min. 10 to max. 20 ECTS credits)											
10-HCI-PRIS	2018-WS	Principles of Interactive Systems Principles of Interactive Systems	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 90 min.)	German and/or English		1) Creditable for bonus 2) German and/or English
10-HCI-MMI	2015-WS	Multimodal Interfaces Multimodal Interfaces	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 90 min.) or presentation of	German and/or English		1) Creditable for bonus

								project results (approx. 30 min.)			2) German and/or English
10-HCI-3DUI	2015-WS	3D User Interfaces 3D User Interfaces	V(2) + Ü(2)	5	1		NUM	Presentation of project results (approx. 30 min.)	German and/or English		1) Creditable for bonus 2) German and/or English
10-xtAI=XRM	2020-WS	Selected Topics in XR Methods Selected Topics in XR Methods	V(2) + Ü(2)	5	1		NUM	a) Written exam (approx. 60-90 min.) or b) Project work: Report (approx. 20 pages) with presentation (30-45 min.) followed by discussion on the topic or c) Individual oral examination (approx. 20 min.) or d) Group oral examination (max. 3 TN, each approx. 15 min.)	English		1) Creditable for bonus 2) English
xtAI Application & Technologies (min. 10 to max. 25 ECTS credits)											
10-LURI=3D	2020-WS	3D Point Cloud Processing 3D Point Cloud Processing	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus 2) German and/or English
10-LURI=AA	2020-WS	Advanced Automation Advanced Automation	V(4) + Ü(2)	8	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus 2) German and/or English
10-xtAI=RO1	2020-WS	Robotics 1 Robotics 1	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=RO2	2020-WS	Robotics 2 Robotics 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English

10-I=DB2	2016-SS	Datenbanken 2 Databases 2	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus
10-xtAI=SAC	2020-WS	Self-aware Computing Self-aware Computing	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-I=ICG	2016-SS	Interaktive Computergraphik Interactive Computer Graphics	V(2)+ Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus 6) Separate written exam for Master's students
10-xtAI=WPrakt	2020-WS	Wissenschaftliches Praktikum xtAI xtAI Scientific Internship	P	10	1		B/NB	Placement report (approx. 2 pages)	German and/or English		5) 8 weeks
10-xtAI=ISS	2020-WS	xtAI International Summer School xtAI International Summer School	R(6)	5	1		NUM	a) Written exam (approx. 60-90 min.) or b) Project work: Report (approx. 20 pages) with presentation (30-45 min.) followed by discussion on the topic or c) Individual oral examination (approx. 20 min.) or d) Group oral examination (max. 3 TN, each approx. 15 min.)	English		2) English 5) Project is conducted in blocks, duration 4-6 weeks
07-MLBI	2020-WS	Maschinelles Lernen in der Bioinformatik Machine Learning in Bioinformatics	V(2)+ Ü(2)	5	1	10 (Los)	NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-xtAI=ST	2020-WS	Selected Topics in xtAI Application & Technologies Selected Topics in xtAI Application & Technologies	V(2) + Ü(2)	5	1		NUM	a) Written exam (approx. 60-90 min.) or b) Project work: Report (approx. 20 pages) with presentation (30-45 min.)	English		1) Creditable for bonus 2) English

								followed by discussion on the topic or c) Individual oral examination (approx. 20 min.) or d) Group oral examination (max. 3 TN, each approx. 15 min.)			
Computer Science (min 0 to max. 10 ECTS credits)											
10-I=ST	2016-SS	Simulationstechnik zur Systemanalyse Discrete Event Simulation	V(4)+ Ü(2)	8	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus
10-I=SSS	2017-WS	Sicherheit von Softwaresystemen Security of Software Systems	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	English		1) Creditable for bonus 2) English
10-I=DDB	2017-WS	Deduktive Datenbanken Deductive Databases	V(2) + Ü(2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus
10-I=AKII	2018-WS	Ausgewählte Kapitel der Informatik Selected Topics in Computer Science	V(2) + Ü(2) or S (2)	5	1		NUM	Written exam (approx. 60-120 min.) ¹	German and/or English		1) Creditable for bonus
Area of degree finalisation (30 ECTS credits)											
10-xtAI=MA	2020-WS	xtAI Master's Thesis xtAI Master's Thesis		25	1		NUM	Master's thesis (50-100 pages)	English		5) Time for completion: 6 months
10-xtAI=MK	2020-WS	xtAI Concluding Colloquium xtAI Concluding Colloquium	K	5	1		B/NB	Master's defence (approx. 60 min.)	English		

¹After prior notification by the lecturer at the beginning of the course, the written exam can be replaced by an individual oral examination (approx. 20 min.) or a group oral examination (2 participants, each approx. 15 min.).

²Methods of assessment: a) written exam or b) log or c) individual oral examination or d) group oral examination with up to three persons or e) class presentation. Method of assessment, duration and scale are announced before the course commences and are generally a) written exam (30-60 min.; also multiple choice) or b) log (15-30 pages) or c) individual oral examination (30-60 min.) or d) group oral examination with up to three persons (30-60 min.) or e) class presentation (20-45 min.).