

# Module Catalogue for the Subject

# Artificial Intelligence and Data Science

as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Examination regulations version: 2024 Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Computer Science

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#### UNIVERSITÄT WÜRZBURG

## **Learning Outcomes**

German contents and learning outcome available but not translated yet.

# Nach erfolgreichem Abschluss des Studiums verfügen die Absolventinnen und Absolventen über die folgenden Kompetenzen:

- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, die Fähigkeit zu analytischem Denken, hohe Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Sie verstehen die Grundlagen und Zusammenhänge der Informatik.
- Sie verfügen über Kenntnisse der mathematischen und theoretischen Grundlagen der Informatik sowie über die theoretischen und praktischen Methoden zur Erlangung neuer Erkenntnisse.
- Sie können Experimente durchführen, Daten erheben und auswerten.
- Sie sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten, informatische und mathematische Methoden unter Anleitung auf konkrete praktische oder theoretische Aufgabenstellungen aus der Informatik anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Sie sind in der Lage, ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darzustellen und zu vertreten.
- Die Absolventinnen und Absolventen verfügen über einen breiten Überblick über die Teilgebiete der Künstliche Intelligenz und Data Science, und interdisziplinäre Zusammenhänge.
- Sie sind in der Lage, ihre Fähigkeiten und Kenntnisse in Projekten umzusetzen und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Künstlichen Intelligenz oder Data Science.
- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen kennen wichtige Anforderungen und Arbeitsweisen im gewerblichen Umfeld sowie in Forschung und Entwicklung.

#### Wissenschaftliche Befähigung

- Die Absolventinnen und Absolventen besitzen Abstraktionsvermögen, die Fähigkeit zu analytischem Denken, hohe Problemlösungskompetenz und die Fähigkeit, komplexe Zusammenhänge zu strukturieren.
- Die Absolventinnen und Absolventen können Experimente durchführen, Daten erheben und auswerten.
- Die Absolventinnen und Absolventen sind in der Lage, sich mit Hilfe von Fachliteratur in neue Aufgabengebiete einzuarbeiten, informatische und mathematische Methoden unter Anleitung auf konkrete praktische oder theoretische Aufgabenstellungen aus der Informatik anzuwenden, Lösungswege zu entwickeln und die Ergebnisse zu interpretieren und zu bewerten.
- Die Absolventinnen und Absolventen kennen die wissenschaftliche Arbeitsweise und sind in der Lage, Probleme aus der Informatik unter Beachtung der Regeln guter wissenschaftlicher Praxis zu bearbeiten.
- Sie sind in der Lage, ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darzustellen und zu vertreten.

#### Befähigung zur Aufnahme einer Erwerbstätigkeit

• Sie sind in der Lage, ihre Fähigkeiten und Kenntnisse in Projekten umzusetzen und verfügen über Kenntnisse des aktuellen Forschungsstandes in mindestens einem Spezialgebiet der Künstlichen Intelligenz oder Data Science.

- Die Absolventinnen und Absolventen sind in der Lage, konstruktiv und zielorientiert in einem Team zusammenzuarbeiten und auftretende Konflikte zu lösen (Teamfähigkeit).
- Die Absolventinnen und Absolventen können ihre erworbenen Kompetenzen in unterschiedlichen interkulturellen Kontexten und in international zusammengesetzten Teams anwenden.
- Die Absolventinnen und Absolventen kennen wichtige Anforderungen und Arbeitsweisen im gewerblichen Umfeld sowie in Forschung und Entwicklung.

#### Persönlichkeitsentwicklung

- Eigenverantwortlichkeit, Selbstständigkeit, Zeitmanagement, Teamfähigkeit
- Die Absolventinnen und Absolventen kennen die Regeln guter wissenschaftlicher Praxis und beachten sie.
- Die Absolventinnen und Absolventen können ihr Wissen und ihre Erkenntnisse einem Fachpublikum gegenüber darstellen und vertreten.

#### Befähigung zum gesellschaftlichen Engagement

- Die Absolventinnen und Absolventen können naturwissenschaftliche Entwicklungen kritisch reflektieren und deren Auswirkungen auf die Wirtschaft, Gesellschaft und die Umwelt in Ansätzen erfassen, zum Beispiel Technikfolgenabschätzung, Ethik, IT-Recht oder Datenschutz.
- Die Absolventinnen und Absolventen haben ihr Wissen bezüglich wirtschaftlicher, gesellschaftlicher, kultureller etc. Fragestellungen erweitert und können in Ansätzen begründet Position beziehen.
- Die Absolventinnen und Absolventen entwickeln die Bereitschaft und Fähigkeit, ihre Kompetenzen in partizipative Prozesse einzubringen und aktiv an Entscheidungen mitzuwirken.

## Abbreviations used

Course types:  $\mathbf{E}$  = field trip,  $\mathbf{K}$  = colloquium,  $\mathbf{O}$  = conversatorium,  $\mathbf{P}$  = placement/lab course,  $\mathbf{R}$  = project,  $\mathbf{S}$  = seminar,  $\mathbf{T}$  = tutorial,  $\ddot{\mathbf{U}}$  = exercise,  $\mathbf{V}$  = lecture

Term: **SS** = summer semester, **WS** = winter semester

Methods of grading: **NUM** = numerical grade, **B/NB** = (not) successfully completed

Regulations: **(L)ASPO** = general academic and examination regulations (for teaching-degree programmes), **FSB** = subject-specific provisions, **SFB** = list of modules

Other: **A** = thesis, **LV** = course(s), **PL** = assessment(s), **TN** = participants, **VL** = prerequisite(s)

## Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

### Notes

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 will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

#### In accordance with

the general regulations governing the degree subject described in this module catalogue:

#### ASPO2015

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

#### 31-Jan-2024 (2024-7)

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.



# **Compulsory Courses**

(115 ECTS credits)



# Artificial Intelligence and Data Science

(70 ECTS credits)

Module title				Abbreviation			
Algorithms, AI and Data Science 1			10-I-AKIDS1-222-mo	1			
Module coordinator			Module offered by				
Dean of	f Studi	es Informatik (Computer	Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
10	nume	rical grade					
Duratio	on	Module level	Other prerequisites	;			
1 seme	ster	undergraduate					
Conten	ts						
sics of algorithms (building blocks, determinism, functional vs. imperative paradigm); Core data structures (lists, sets, stack, queue, heap), together with basics of programming (in Python); Algorithmic complexity: time and memory complexity, growth of functions, asymptotic notation and "Big-O"; Sorting (bubble, insert, heap, merge and quick sort) and algorithms of order statistics; Advanced data structures with associated algorithms: Hash tables (and hash functions), trees (binary search trees, red-black trees) and graphs (connected components, shortest path, minimum spanning tree); algorithm design and recursion; dynamic programming; state space search: Uninformed (depth/width first search), heuristic (A* algorithm), adversarial (MiniMax, alpha-beta pruning) and metaheuristic search (genetic algorithm, ant colony optimization); Function optimization (convex vs. non-convex optimization, numerical optimization, numerical optimization with gradient descent) and constrained optimization algorithms (linear and quadratic programming, branch-and-bound algorithm); learning from data: light introduction to machine learning (parametric and non-parametric classification models, clustering). Intended learning outcomes Students will acquire fundamental knowledge of algorithms and data structures used throughout computer science, with a particular focus on the fundamentals of artificial intelligence algorithms and data science (e.g. state space search or optimization). They will acquire both theoretical and practical knowledge (as they will have to implement most of the algorithms covered). They will be able to analyze practical problems from an algorithmic perspective, identify the nature of the problem and choose an optimal algorithmic approach to solve the problem. In this course, students will acquire basic algorithmic knowledge, which they will extend and develop							
Courses	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ge	rman)			
V (4) +	Ü (2)						
Methoo module is	<b>d of ass</b> creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German,	examination offered — if no	t every semester, informatio	on on whether	
written If annou examin prox. 15 credital	examin unced nation c 5 minut ble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap tes per candidate). bonus	minutes). inning of the course, oprox. 20 minutes) or	the written examina an oral examination	tion may be replaced in groups of 2 candio	by an oral dates (ap-	
Allocat	ion of <b>j</b>	olaces					
Additio	onal inf	ormation					
Workload							
300 h							
Teaching cycle							
Referre	Referred to in LPO I (examination regulations for teaching-degree programmes)						
Bachelor's Data Scienc	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reş ünstliche Intelligenz und Data	g. data record Ba- Science - 2024	page 10 / 154	

#### Module appears in

Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title				Abbreviation		
Algorithms, AI and Data Science 2				10-I-AKIDS2-222-m01		
Module	coord	inator		Module offered by		
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Building algorith mic stra duced. duction can be	g on th amic for ategies A treat of sim addres	e introductory course "Al undations of computer so for solving fundamental ment of elementary prob ple statistical methods w sed.	gorithms, AI and Data cience and artificial ir problems, approache abilistic methods for vith which supervised	a Science 1", this mo ntelligence. In additi es to logical reasonir modeling uncertaint I and unsupervised p	dule introduces the logical and on to dealing with basic algorith- ng in computer science are intro- cies forms the basis for the intro- problems of machine learning	
Intende	ed learr	ning outcomes				
Studen develop in comr tificial i mal app	ts mas o soluti non pro ntellige oroach	ter the logical and algorit ions for specific compute oblem-solving strategies ence. They know basic ap es for modeling uncertair	hmic fundamentals c r science problems u and have initial expe proaches for deriving nties and know how t	f computer science. sing an analytical ap rience of how these g logical conclusions hese are used in the	They are able to independently pproach. Students are proficient can be used in the context of ar- s, have an understanding of for- context of machine learning.	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (4) +	Ü (2)					
Methoo module is	l of ass creditab	<b>essment</b> (type, scope, langua) le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
written If annou examin prox. 15 credital	examir unced l ation o 5 minut ble for	nation (approx. 60 to 120 by the lecturer at the beg if one candidate each (ap es per candidate). bonus	minutes). inning of the course, oprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
300 h						
Teachir	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachel	Bachelor's degree (1 major) Mathematical Data Science (2022)					
Bachelo	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2023)		
Bachelo	or's de	gree (1 major) Artificial In	telligence and Data S	cience (2024)		

Module title				Abbreviation	
Practical Course in Programming for Artificial Intelligence and Data Science					10-I-PP-KIDS-222-m01
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Informatik (Computer	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1-2 sem	nester	undergraduate	Intended learning ou GdP. It is therefore s	utcomes of the follow strongly recommende	wing module are required: 10-l- ed to complete this before.
Conten	ts				
Intende	ed lear	ning outcomes			
Course	<b>S</b> (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)	
P (6)					
Methoo module is	<b>d of ass</b> s creditab	<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
practica minute If anno examin prox. 19 Langua	al exan s) unced nation c 5 minut uge of a	nination (programming ex by the lecturer at the beg of one candidate each (ap res per candidate). ssessment: German and,	vercises, approx. 240 inning of the course, oprox. 20 minutes) or /or English	hours) and written e the written examina an oral examination	examination (approx. 60 to 120 tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teachi	ng cycl	9			
Referred to in LPO I (examination regulations for teaching-degree programmes)					
Module	e appea	irs in			
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	ocience (2022)	
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	Science (2023)	
			<u> </u>	× · P	

Module title					Abbreviation	
Artificia	Artificial Intelligence and Data Science Lab 1 10-I-KIDS-Lab1-232-m01					
Module	coord	inator		Module offered by		
Dean of	f Studi	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Artificia design niques and ref of artifi	and de and lib inemer cial int	Igence and Data Science evelopment of an Al appli praries of data handling a nt of an application proto elligence and data science	Lab 1 provides know cation. In theoretical nd processing. Conce type are learned in gr ce as well as current of	ledge of the most im or practical form, kn epts, planning, draft roup work. Lectures design and solution	portant steps and tools for the nowledge such as common tech- ing, design, creation, evaluation cover the basic scientific issues approaches.	
Intende	ed lear	ning outcomes				
At the e They ha luation	end of L ave in-c of Al a	ab 1, students will be ab depth knowledge in the fo pplications.	le to work through th ollowing areas: Desig	e entire developmer n, design decisions,	nt process of an AI application. development and scientific eva-	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
R (6) Module	taugh	t in: German or English				
Methoo module is	<b>l of ass</b> creditab	<b>Sessment</b> (type, scope, langua Ile for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
present Langua credital	tation o ge of a ble for	of project results (30 to 4 ssessment: German and, bonus	5 minutes) /or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
300 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	appea	ars in				
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	Science (2023)		
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)						

Module title					Abbreviation	
Artificia	Artificial Intelligence and Data Science Lab 2 10-I-KIDS-Lab2-232-mo1					
Module	e coord	inator		Module offered by		
Dean of	f Studi	es Informatik (Computer	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
identifi der to n taught. design	ed to e neet th Within and ex	xtend the existing applic e requirements of an Al a the Artificial Intelligence tension of Al application	ation prototype and o pplication prototype and Data Science La s are taught.	develop it into a fully , further data proces b 2, the basic theor	v functional application. In or- sing and mining approaches are etical and practical skills for the	
Intende	ed lear	ning outcomes				
By com they ha have le	pleting ive acq arned l	g Lab 2, students have co uired now goes deep into how to design and imple	mpleted the entire de the programmatic d ment artificial intellig	evelopment cycle of etails of Al applicati ence systems in cur	an AI application. The knowledge ons. At the same time, students rent frameworks.	
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
R (6) Module	e taugh	t in: German and/or Engl	ish			
Methoo module is	<b>d of ass</b> creditab	<b>Sessment</b> (type, scope, langua Ile for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
present Langua credita	tation o ge of a ble for	of project results (30 to 4 ssessment: German and, bonus	5 minutes) /or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
300 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	Science (2023)		
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)						

Module title					Abbreviation	
Artificia	al Intel	igence and Data Science	Lab 3		10-I-KIDS-Lab3-232-m01	
Module	coord	inator		Module offered by		
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
In the artificial intelligence and data science courses, fundamental aspects and skills are taught that students can understand in the corresponding exercises. In Artificial Intelligence and Data Science Lab 3, these various skills and aspects are integrated in order to independently develop a comprehensive AI application. As in Lab 1 and Lab 2, the projects are worked on in groups. Depending on the students' interests, highly specialized and innovative applications from the field of AI can be developed. Lectures and exercises consolidate the necessary						
Intende	ed learn	ning outcomes				
At the e action o jects ar	end of L of the in nd mak	ab 3, students have a de ndividual components ar e complex modifications	eper understanding Id solutions. In partic to Al models.	of the architectures of the architectures of the architectures of the second second second second second second	of AI applications and the inter- e able to design extensive AI pro-	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
R (6) Module	taugh	t in: German or English				
Method module is	<b>l of ass</b> creditab	<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether	
present Langua credital	tation c ge of a ble for	f project results (30 to 4) ssessment: German and, bonus	5 minutes) /or English			
Allocat	ion of p	olaces				
Additio	nal infe	ormation				
Worklo	ad					
300 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module	Module appears in					
Bachelo Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)					

Module title			Abbreviation		
Data So	Data Science & Machine Learning   10-I-DSML-222-m01				
Module	e coord	inator		Module offered by	
Dean o	f Studi	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Intende	ed lear	ning outcomes			
Course	<b>S</b> (type, r	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (2) +	Ü (2)				
Methoo module is	<b>d of ass</b> creditab	s <b>essment</b> (type, scope, langua <sub>)</sub> le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
If anno examin prox. 19 credita	examin unced ation c 5 minut ble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap res per candidate). bonus	minutes). inning of the course, pprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachi	ng cycl	e			
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module appears in					
Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)					

Module title				Abbreviation		
Deep Learning 10-I-DL-2					10-l-DL-222-m01	
Module coordinator				Module offered by		
Dean o	f Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Modulo loval	Other prerequisites			
Duratio	-					
1 seme	ster	undergraduate				
Conten	ts					
applica method field of retical f all the and tex	The lecture provides advanced knowledge of deep learning techniques such as FCN, CNN and LSTMs, practical application examples for NN architectures, e.g. in the field of image and speech processing. Current models and methods of machine learning and their technical background are presented. Building on this, models from the field of deep learning, such as CNNs, RNNs and sequence-to-sequence architectures, are discussed. The theoretical foundations of these models, such as training through backpropagation, are also discussed in detail. For all the models covered, it is shown how they are used in practice for specific problems such as image processing and text generation.					
Intende	ed lear	ning outcomes				
Studen res and res fror	ts have I how tl n the li	e knowledge of the pos hey are implemented in terature, of data prepa	sible applications and n tools such as Tensorf ration and of solving co	limitations of deep l low/Keras, of the abi oncrete tasks.	earning, of importan lity to reprogram net	t architectu- work structu-
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) +	Ü (2)					
Method	d of ass	sessment (type, scope, lang	guage — if other than German.	examination offered — if no	ot everv semester, informati	on on whether
module is	s creditab	le for bonus)				
written If anno examin prox. 19 credita	examin unced ation c 5 minut ble for	nation (approx. 60 to 1 by the lecturer at the b of one candidate each ( tes per candidate). bonus	20 minutes). eginning of the course, (approx. 20 minutes) or	the written examina an oral examinatior	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of <sub>l</sub>	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Toochi						
Teacini	ig tyti	e				
Referred to In LPO I (examination regulations for teaching-degree programmes)						
§ 22 II Nr. 3 b)						
Module appears in						
Bachelor's degree (1 major) Mathematical Data Science (2022)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)					
Bachel	or sae	gree (1 major) Games E	ingineering (2025)			
First st	ur s de	gree (1 major) Compute	er scierice (2025)	Computer Scienco (	2025)	
Bachelor's	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene	rated 18-Jun-2025 • exam. res	g. data record Ba-	page 18 / 154
Data Scienc	ce (2024)	,	chelor (180 ECTS) Ki	instliche Intelligenz und Data	Science - 2024	,



Bachelor's degree (1 major) Computer Science and Sustainability (2025)



# **Computer Science** (20 ECTS credits)

Bachelor's with 1 major Artificial Intelligence and Data Science (2024)

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Module title				Abbreviation		
Fundamentals of Programming         10				10-l-GdP-172-m01		
Module coordinator			Module offered by			
holder	ofthe	Chair of Computer Scier	nce II	Institute of Comput	er Science	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
-	nume	rical grade				
Duratio	nunc	Module level	Other prorequisites			
Duratio						
1 seme	ester	undergraduate				
Conten	Contents					
ject ori	/pes, co ientatio	n in Java, selected topi	ations of procedural pr cs of C++, further Java (	ogramming, selected concepts, digression	: scripting language	s.
Intend	ed lear	ning outcomes				
The stu and are	udents e able t	possess a fundamental o independently develo	knowledge about prog op average to high leve	gramming languages l Java programs.	(in particular Java, C	C and C++)
Course	<b>es</b> (type, r	number of weekly contact hours	s, language — if other than Gei	rman)		
V (2) +	Ü (2)					
Metho module is	<b>d of ass</b> s creditab	sessment (type, scope, lang ble for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	ion on whether
franno examir prox. 1 credita	nation of minut	by the lecturer at the be of one candidate each ( tes per candidate). bonus	approx. 20 minutes) or	an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	tion of p	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	е				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)		
§4911	Nr. 1 b)					
§6911	Nr. 1 b)					
Module	e appea	ars in				
Bachel	lor's de	gree (1 major) Physics (	2015)			
Bachel	lor's de	gree (1 major) Aerospac	ce Computer Science (2	2017)		
Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's degree (1 major) Computer Science (2019)						
Bachelor's degree (1 major) Business Information Systems (2020)						
Bachel	lor's de	gree (1 major) Physics (	2020)	2020)		
Bachel	Bachelor's degree (1 major) Aerospace Computer Science (2020)					
Bachel	Bachelor's degree (1 major) Computer Science and Sustainability (2021)					
Bachel	Dachelor's degree (1 major) Business information Systems (2021) Bachelor's degree (1 major) Mathematical Data Science (2022)					
Bachel	Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)					
Bachelor's Data Scien	with 1 ma ice (2024)	jor Artificial Intelligence and	JMU Würzburg • gener chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- Science - 2024	page 21 / 154

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation		
Introduction into Human-Computer Interaction					10-I-MCS-242-m01		
Module coordinator				Module offered by			
holder of the Chair of Computer Science			nce IX	IX Institute of Computer Science			
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites	i			
1 seme	ster	undergraduate					
Conten	Contents						
Human stems. technic design human evalua means Accom evalua	Human-Computer Interaction studies the design, evaluation, and implementation of interactive computer sy- stems. Special focus lies on fundamental psychological and physiological properties of the human users, the technical principals and models of modern computer systems, as well as on the derived boundary conditions of designing usable and human-oriented interactions with technical systems. The topics of this course cover the human perception and cognition, the human memory and attention, the design of interactive systems, popuplar evaluation methods, principles of computer systems, input processing techniques, human interfaces and typical means of interaction, from text-based input methods over graphical user interfaces to multi-modal interfaces. Accompanying practical tasks convey to the students typical methods of requirement analysis, prototyping and						
Intend	ed lear	ning outcomes					
After si face de tions o les.	uccessi esign p f mode	fully completing this co rinciples. They understa rn user interfaces. They	urse, students have a f and the possibilities ar v know the necessary s	fundamental underst nd limitations of tech teps of user-centric o	anding of human-co nology and user and design and typical de	mputer inter- l the applica- esign princip-	
Course	<b>S</b> (type, 1	number of weekly contact hour	s, language — if other than Ge	rman)			
V (3) +	Ü (1)						
Metho module is	<b>d of as:</b> s creditat	s <b>essment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether	
a) writt b) pres c) oral Langua credita	en exa entatic examir age of a ble for	mination (approx. 120 n on (30 to 60 minutes) o nation of one candidate issessment: German ar bonus	ninutes) or - each (30 to 60 minute d/or English	s)			
Allocat	ion of	places					
Additio	onal inf	ormation					
Worklo	ad						
150 h							
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)			
§ 22	Nr. 3 b)						
Module	e appea	ars in					
Bachel Bachel Bachel Bachel	Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025)						
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- Science - 2024	page 23 / 154	



First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title				Abbreviation			
Databa	Databases 10-I-DB-152-m01						
Module	e coord	inator		Module offered by			
Dean o	Dean of Studies Informatik (Computer Science) Institute of Computer Science						
ECTS	Meth	od of grading	Only after succ. cor	Only after succ. compl. of module(s)			
5	nume	rical grade					
Duratio	n		Other prerequisites				
<b>Duration</b>	stor	undorgraduato					
1 Sellie	ster	undergraduate					
Conten					1.6		
Relatio ment.	onal alg	ebra and complex SQL	statements; database	planning and norma	l forms; transaction	manage-	
Intend	ed lear	ning outcomes					
The stu	udents	possess knowledge ab	out database modellin	g and queries in SQL	as well as transaction	ons.	
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
V (2) +	Ü (2)						
Metho module is	<b>d of ass</b> s creditab	s <b>essment</b> (type, scope, lang Ile for bonus)	uage — if other than German,	examination offered — if no	ot every semester, informati	ion on whether	
If anno examir prox. 1 Langua credita	punced nation of 5 minut age of a ble for	by the lecturer at the b of one candidate each ( ces per candidate). ssessment: German ar bonus	eginning of the course, approx. 20 minutes) or id/or English	the written examina r an oral examinatior	tion may be replaced in groups of 2 cand	d by an oral idates (ap-	
Allocat	tion of j	olaces					
	_						
Additio	onal inf	ormation					
Worklo	ad						
150 h							
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)			
§ 49   N	Vr. 1 b)						
§ 69 I N	Vr. 1 b)						
Module	e appea	ars in					
Bachel	or's de	gree (1 major) Compute	er Science (2015)				
Bachel	or's de	gree (1 major) Mathem	atics (2015)				
Bachelor's degree (1 major) Business Information Systems (2015)							
Bachelor's degree (1 major) Computational Mathematics (2015)							
Bachelor's degree (1 major) Aerospace Computer Science (2015)							
Bachelor's degree (1 major) Functional Materials (2015)							
First st	ate exa	mination for the teaching	ng degree Realschule (	Computer Science (2	015)		
First st	ate exa	mination for the teachi	ng degree Gymnasium	Computer Science (2	2015)		
Rachel	s aegr	ee (1 major) Physics (2)	J10)	(2016)			
	or's de	gree (1 major) Business	S miorination Systems	(2010)			
Dachel	or s ue	Sice (I major) Aerospa		201/)			
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- a Science - 2024	page 25 / 154	

#### UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Functional Materials (2021) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation		
Softwa	Software Technology for Artificial Intelligence and Data Science 10-I-ST-KIDS-222-m01						
Module	e coord	inator		Module offered by			
Dean o	f Studie	es Informatik (Computer	Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Intende	ed learı	ning outcomes					
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (2) +	Ü (2)						
Method module is	<b>d of ass</b> creditab	s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
written If anno examin prox. 19 credita	examinunced ation o 5 minut ble for	nation (approx. 60 to 120 by the lecturer at the beg If one candidate each (ap es per candidate). bonus	minutes). inning of the course, oprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
150 h							
Teachi	ng cycl	e					
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module	e appea	ars in					
Bachel	or's de	gree (1 major) Mathemati	cal Data Science (20:	22)			
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2023)			
bachel		gree (1 major) Artificial In	temgence and Data S	cience (2024)			





# Mathematics (25 ECTS credits)

Module title					Abbreviation		
Mather	Mathematics for Artificial Intelligence and Data Science 1				10-M-KIDS1-222-m01		
Module coordinator				Module offered by			
Dean of	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
10	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Proposi integers system	itional s; elem s of lin	logic, set theory, proof te entary group theory; resi ear equations.	chniques, relations; due class rings; basi	sequences, limits ar cs in linear algebra,	nd lambda-symbols; the ring of linear maps and matrix calculus,		
Intende	ed learı	ning outcomes					
The stu to apply is able	dent ge y these to inter	ets acquainted with fund methods to problems in pret the results.	amental concepts an natural and enginee	d methods of advand ring sciences, in part	ced mathematics. He/She learns ticular in computer science, and		
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (5) + ĺ	Ü (2)						
Methoo module is	<b>of ass</b> creditab	e <b>essment</b> (type, scope, langua; le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
written If annou examin prox. 15 Langua credital	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English						
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
300 h							
Teachir	ng cycl	e					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			
Module	appea	irs in					
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	icience (2022)			
Bachel	or's deg or's deg	gree (1 major) Artificial In gree (1 major) Artificial In	telligence and Data S telligence and Data S	Science (2023)			
Duchen				2024)			

Module title					Abbreviation	
Mather	natics	for Artificial Intelligence	and Data Science 2		10-M-KIDS2-222-m01	
Module	e coord	inator		Module offered by		
Dean of	fStudi	es Mathematik (Mathema	atics)	Institute of Mathem	atics	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
10	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Determ distribu	inants, utions,	eigenvalue theory; even parameter estimates; ba	t and probability spa sics in analysis.	ces, combinatorics,	random variables, examples of	
Intende	ed leari	ning outcomes				
The stu to appl is able	dent ge y these to inter	ets acquainted with fund methods to problems in rpret the results.	amental concepts an natural and engineer	d methods of advand ring sciences, in part	ced mathematics. He/She learns ticular in computer science, and	
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
V (5) + I	Ü (2)					
Methoo module is	<b>d of ass</b> creditab	s <b>essment</b> (type, scope, langua; le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
written If anno examin prox. 15 Langua credital	examin unced ation o minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg if one candidate each (ap res per candidate). ssessment: German and/ bonus	minutes). inning of the course, pprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
300 h						
Teaching cycle						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)		
Module	appea	irs in				
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2022)		
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	cience (2023)		
	- (		5	5 P		

Module title					Abbreviation		
Mather	natics	for Artificial Intelligence	and Data Science 3		10-M-KIDS3-222-m01		
Module coordinator				Module offered by			
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Histogr thogon cation,	am, ba ality, m approx	nd width selection, boxp atrix calculus, matrix fac imation and dimension r	lot, kernel estimatior torisation, tensors, le reduction	n, stochastic models east squares, singula	and calibration, correlation, or- ar value decomposition, classifi-		
Intende	ed learn	ning outcomes					
The stu practica	dent is al prob	acquainted with the fundlems.	damental methods ar	nd concepts of data	science and can apply them to		
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
V (2) +	Ü (1)						
Methoo module is	<b>l of ass</b> creditab	s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
written If annou examin prox. 15 Langua credital	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English						
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
150 h							
Teachir	ng cycl	9					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			
Module	e appea	irs in					
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachel	ge prog or's deg or's deg	gram Mathematics (2023) gree (1 major) Artificial In groo (1 major) Artificial In	) telligence and Data S telligence and Data S	cience (2023)			
Dachell	u s ueș	siee (1 major) Artificial III	temgence and Data S	(2024)			



# **Compulsory Electives**

(35 ECTS credits)



# **Artificial Intelligence and Data Science**

(15 ECTS credits)

Module title					Abbreviation		
Computer Vision					10-I-CV-222-m01		
Module	Module coordinator			Module offered by			
holder	of the (	Chair of Computer Scie	nce IV	Institute of Computer Science			
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	Its						
the rec It show is cons turns to near fil proced the rec zed. A	ent use idered o image ters) us ures to ognitio large pa	e of deep learning. It sta image processing is en and the image acquisit e representation and di sed to enhance image of extract information fro n of objects (specific a art of the course conce	arts with an overview o tering multiple fields fr tion cameras and illum scretization, and descr quality and/or detect s m multiple images, with nd/or class level) will b rns deep learning and p	f existing and emerg om our daily life. Firs- ination sources are a ibes pre-processing pecific features. The ch motion and 3D sha be discussed and dif Al-based approaches	ing computer vision st, the light-matter ir also discussed. The steps (such as linea course will continue ape as major examp ferent approaches w s to vision tasks.	applications. nteraction course then r and non-li- by analyzing les. Finally, ill be analy-	
Intend	ed lear	ning outcomes					
t t • L • L • L s	ure, sa racking Jnderst Deployn Jnderst	mpling, quantization, or , object recognition. anding of deep learnin nent of vision and learr anding of vision proble particular algorithms.	g (MLP, ConvNets, arch ing algorithms from st ems, and the ability to p	extraction, segment itectures) and the a andard libraries. propose, debug, vali	ation, 3D acquisition pplication to visual o date and explain sol	n, motion, lata. utions ba-	
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
V (2) + Module	Ü (2) e taugh	t in: German and/or En	glish				
Metho module is	<b>d of ass</b> s creditab	<b>sessment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether	
written If anno examir prox. 19 Langua credita	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus						
Allocat	ion of <sub>l</sub>	olaces					
Additio	onal inf	ormation					
Workload							
150 h							
Teaching cycle							
Referre	<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 22	Nr. 3 b)						
Bachelor's Data Scien	with 1 ma ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. re instliche Intelligenz und Data	g. data record Ba- a Science - 2024	page 34 / 154	

#### Module appears in

Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Games Engineering (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Bachelor's with 1 major Artificial Intelligence and Data Science (2024)

Module title					Abbreviation	
Natural Language Processing					10-I-NLP-222-m01	
Module	e coord	inator		Module offered by		
holder	of the (	Chair of Computer Scie	nce XII	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Introdu text dat stemmi ons and Models nal sem embed networl lysis) vs tasks (e	ction to ta (bag ing); Co d termi and Co nantics dings; ks, Trai s. toke	o Text Mining and Natu -of-words) and text pre orpus linguistics and le nology extraction); Syn onditional Random Fiel and latent text represe Light introduction to (n nsformers. NLP Applica n classification tasks (e chine translation and t	ral Language Processin processing (sentence s xical association meas tactic analysis: Part-of- ds), parsing (Probabilis entations: distributiona nodern) deep learning- tions: text classificatio e.g., information extract ext summarization)	g; Traditional compu- plitting, tokenization ures (ngram frequen Speech tagging and stic Context Free Gra I hypothesis, Latent based NLP: embeddi n tasks (e.g., docum tion - named entity re	atational representa- n, morphological noi cies, co-occurrences chunking (with Hido mmars and parsers) Semantic Analysis ( ngs, convolutional a ent classification, se ecognition) vs. text g	tions of rmalization, s, collocati- den Markov ; Distributio- LSA), word and recurrent entiment ana- generation
Intende	d loar	ning outcomes				
Studen of text i knowle well as experie	ts will mining dge: ar the ap nce im	obtain broad theoretica and natural language nalyze the text data for propriate (machine lea plementing solutions f	al and practical knowled processing. They will be the task at hand, choo rning for NLP) model to or a wide range of com	dge of the typical me e able to solve practi se the appropriate re solve the task. They mon NLP tasks and a	ethods and algorithm cal problems with the presentation for the will have gained ric applications.	ns in the field ne obtain Pir texts as h practical
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ger	rman)		
V (2) + Module	Ü (2) e taugh	t in: German and/or En	glish			
<b>Method</b> module is	<b>l of ass</b> creditab	<b>sessment</b> (type, scope, lang le for bonus)	uage — if other than German, o	examination offered — if no	t every semester, informati	ion on whether
written If annou examin prox. 19 Langua credita	examin unced ation c 5 minut ge of a ble for	nation (approx. 60 to 1: by the lecturer at the b of one candidate each ( es per candidate). ssessment: German ar bonus	20 minutes). eginning of the course, approx. 20 minutes) or ud/or English	the written examina an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachir	ng cycl	e				
	<u> </u>					
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	mmes)		
§ 22    Nr. 3 b)						
Module	appea	urs in				
Bachelor's Data Scienc	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gener chelor (180 ECTS) Kü	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 36 / 154
Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Games Engineering (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module	title				Abbreviation
Theory	of Mac	hine Learning			10-I-TML-222-m01
Module	coord	nator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Compute	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Conten	ts				
Intende	ed learr	ing outcomes			
Courses	<b>5</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (2) + Í Module	Ü (2) taught	t in: German and/or Engli	sh		
Method module is	<b>l of ass</b> creditab	<b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
lf annoi examin prox. 15 Langua credital	ation o minut ge of a ble for	by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and/ bonus	inning of the course, prox. 20 minutes) or or English	the written examinat an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocati	ion of p	laces			
Additio	nal info	ormation			
Worklo	ad				
150 h					
Teachir	ng cycl	9			
Referre	d to in	LPO I (examination regulations	for teaching-degree progra	mmes)	
§ 22    N	vr. 3 b)				
Module	appea	rs in			
Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)					
2.5.1000					

Module	title				Abbreviation
Selecte	ed Fund	amentals of Artificial Int	elligence and Data S	cience 1	10-I-AGKIDS1-222-m01
Module	e coord	inator		Module offered by	
Dean of	fStudi	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Selecte	d topic	s in artificial intelligence	and data science		
Intende	ed leari	ning outcomes			
Studen science	ts will e and tr	be able to understand ho ansfer them to related pr	w to solve fundamen oblems.	tal problems in artif	icial intelligence and data
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)	
V (2) +	Ü (2)				
Methoo module is	<b>l of ass</b> creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
If annou examin prox. 15 Langua credital	unced ation c 5 minut ge of a ble for	by the lecturer at the beg of one candidate each (ap ces per candidate). ssessment: German and, bonus	inning of the course, pprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral n in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ıg cycl	e			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
Bachel	or's de	gree (1 major) Mathemati	cal Data Science (202	22)	
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	cience (2022)	
Bachel	or's de	gree (1 major) Artificial In	telligence and Data S	cience (2023)	
bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)				

Module	title				Abbreviation
Selecte	ed Fund	amentals of Artificial Int	elligence and Data S	cience 2	10-I-AGKIDS2-222-m01
Module	e coord	inator		Module offered by	
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Selecte	d topic	s in artificial intelligence	and data science		
Intende	ed learı	ning outcomes			
Studen science	ts will I e and tr	be able to understand ho ansfer them to related pr	w to solve fundamen oblems.	tal problems in artif	icial intelligence and data
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (2) +	Ü (2)				
Methoo module is	<b>d of ass</b> creditab	eessment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
lf annoi examin prox. 15 Langua credital	ation of ation of a minut ge of a ble for	by the lecturer at the beg of one candidate each (ap ses per candidate). ssessment: German and, bonus	inning of the course, pprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
150 h					
Teachir	ıg cycl	e			
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)	
Module	e appea	ars in			
Bachelo	or's de	gree (1 major) Mathemati	cal Data Science (202	22)	
Bachelo	or's de	gree (1 major) Artificial In	telligence and Data S	cience (2022)	
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2023)	
васнею	or's de	gree (1 major) Artificial In	temgence and Data S	cience (2024)	



Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

# **Computer Science** (10 ECTS credits)

Module title Abbreviation						
Digital	l compu	iter systems			10-I-RAL-152-m01	
Modul	e coord	inator		Module offered by		
Dean	of Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS	Meth	od of grading	Only after succ. con	nol. of module(s)		
10	nume	rical grade				
Durati	on		Other prerequisites			
		undorgraduato		•		
Conter	nts	unuergiauuate				
Introdu	uction +	o digital technologies	Boolean algobras, com	hinatony circuite our	chronous and asun	chronous cir
cuits, ł	cuits, hardware description languages, structure of a simple processor, machine programming, memory hierar- chy.					
Intend	ed lear	ning outcomes				
The stu	udents	possess a knowledge o	f the fundamentals of	digital technologies	up to the design and	l program-
ming o   design	ot easy i n of digi	microprocessors as wel tal systems.	l as knowledge for the	application of hardw	are description lang	guages for the
Course	es (type. 1	number of weekly contact hour	s, language — if other than Ge	rman)		
V (4) +	Ü (2)	,				
Metho	d of as	sessment (type, scope, lang	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
module i	is creditat	ole for bonus)				
lf anno examir prox. 1 credita	nation of minuted	by the lecturer at the bo of one candidate each ( tes per candidate). bonus	eginning of the course, approx. 20 minutes) or	the written examina an oral examination	tion may be replace 1 in groups of 2 cand	d by an oral lidates (ap-
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	oad					
300 h						
Teachi	ing cycl	e				
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)		
				·····		
Modul	e appea	ars in				
Bachel	lor's de	gree (1 major) Compute	er Science (2015)			
Bachel	lor's de	gree (1 major) Mathem	atics (2015)			
Bachel	lor's de	gree (1 major) Computa	tional Mathematics (2	015)		
Bachel	lor's de	gree (1 major) Aerospa	ce Computer Science (2	2015)		
Bachel	lor's de	gree (1 major) Aerospa	ce Computer Science (2	2017)		
Bachel	lor's de	gree (1 major) Compute	r Science (2017)			
Bachel	lor's de	gree (1 major) Compute	r Science (2019)			
Modul	e studio	es (Bachelor) Orientieru	ingsstudien (2020)			
Master	r's teac	hing degree Gymnasiur	n MINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (2	020)
Supple	ementa	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2020)	
Bachelor's	s with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 42 / 154
Data Scien	nce (2024)		chelor (180 ECTS) Ki	unstliche intelligenz und Data	Science - 2024	

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)

Module title Abbreviation				Abbreviation	
Computer N	etworks and Information T	ransmission		10-l-RIÜ-191-m01	
Module coo	rdinator		Module offered by		
holder of the	e Chair of Computer Scienc	ce III	Institute of Comput	er Science	
ECTS Met	hod of grading	Only after succ. con	pl. of module(s)		
10 num	nerical grade				
Duration	Module level	Other prerequisites			
1 semester	undergraduate				
Contents					
<ul> <li>Computer networks and the Internet: Structure and Mechanisms of Telecommunication</li> <li>Communication Protocols: Basic Principles and the Layer Model</li> <li>Computer and Communication Systems: Network Systems, Data Traffic in Distributed Systems and inter-network Communication</li> <li>The Internet: Important Protocols and Routing</li> <li>Architecture and Structure of Computer Networks: Network Architecture, Access Mechanisms, Flow Control and Traffic Management</li> <li>Coding Theory: Mechanisms for Error Detection and Error Correction</li> <li>Information Theory: Entropy of Data</li> <li>Digital Communication Systems: Signal Modulation</li> </ul>					
Intended lea	arning outcomes				
Students command the technical, theoretical as well as practical knowledge to understand the structure of com- puter networks, the Internet and communication systems for telecommunication.					
Courses (type	, number of weekly contact hours,	language — if other than Ger	man)		
V (4) + Ü (2)					
Method of a	ssessment (type, scope, langua	age — if other than German, o	examination offered — if no	t every semester, information on whether	
module is credit	able for bonus)				
written exan If announce examinatior prox. 15 min creditable fo	nination (approx. 60 to 120 d by the lecturer at the beg of one candidate each (aj utes per candidate). or bonus	o minutes). ginning of the course, oprox. 20 minutes) or	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocation o	fplaces	-			
	•				
Additional i	nformation	-			
Workload					
300 h					
Teaching cy	cle				
Referred to	in LPO I (examination regulation	s for teaching-degree progra	mmes)		
§ 22    Nr. 3	b), § 69   Nr. 1 c)				
Module app	ears in				
Bachelor's degree (1 major) Computer Science (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021)					
Data Science (202	4)	chelor (180 ECTS) Ki	instliche Intelligenz und Data	Science - 2024	

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025)

Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title Abbreviation						
Theory	of Con	nputation			10-l-Tl-242-m01	
Module	e coord	inator		Module offered by	·	
Dean o	f Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
10	nume	rical grade		-		
Duratio	on	Module level	Other prerequisites	;		
1 seme	ster	undergraduate				
Conten	its					
Compu	itability , conte	, decidability, countab xt-sensitive languages	ility, finite automata, re , complexity of calculat	egular sets, generativ tions, P-NP problem,	ve grammars, contex NP completeness.	t-free lan-
Intend	ed lear	ning outcomes		<u> </u>	·	
The stu tability comple	The students possess a fundamental and applicable knowledge in the areas of computability, decidability, coun- tability, finite automata, regular sets, generative grammars, context-free languages, context-sensitive languages, complexity of computations, P-NP problem, NP completeness.					
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (4) +	Ü (2)					
Metho	d of ass	<b>Sessment</b> (type, scope, lang	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether
module is	s creditab	le for bonus)				
If anno examir prox. 1 credita	unced nation c 5 minut ble for	by the lecturer at the be of one candidate each ( tes per candidate). bonus	eginning of the course, approx. 20 minutes) or	the written examina an oral examination	tion may be replace in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
300 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)		
§ 49   N § 69   N	Nr. 1 a) Nr. 1 a)					
Module	e appea	ars in				
Module	e studie or's de	es (Bachelor) Orientieru gree (1 maior) Artificial	Ingsstudien (2020)	Science (2024)		
Master	's teacl	hing degree Gymnasiun	n MINT Teacher Educat	ion PLUS, Elite Netw	ork Bavaria (ENB) (2	025)
Supple	ementai	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2025)	
Bachel	or's de	gree (1 major) Games E	ngineering (2025)	<b>`</b>		
Bachel	or's de	gree (1 major) Aerospac	ce Computer Science (2 Science (2005)	2025)		
First st	oi side; ate exa	gree (1 major) Compute mination for the teachi	ng degree Realschule (	Computer Science (2	025)	
First st	ate exa	mination for the teachi	ng degree Gymnasium	Computer Science (2	2025)	
Bachel	or's de	gree (1 major) Compute	r Science and Sustaina	ability (2025)	<i></i>	
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 46 / 154

Module	e title				Abbreviation	
IT Secu	irity				10-l-SEC-191-m01	
Module	e coord	inator		Module offered by		
holder	of the (	Chair of Computer Scie	nce II	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
The cou The cou () Cou The cou The The cou The cou	<ul> <li>The course provides a broad sweep through concepts and technologies related to IT security:</li> <li>Theoretical aspects: information-theoretic security, computational security, introduction to cryptography (historical and modern ciphers, hash functions, pseudo-random generators, message authentication co-des, public key cryptography)</li> <li>Network security: protocol security, security of TCP/IP, public key infrastructure, user authentication</li> <li>Software security: Software vulnerabilities, common programming errors and exploitation techniques, reverse engineering and obfuscation, malware and anti-malware</li> <li>Platform security: access control models, security policies, operating system security, virtualization, se-</li> </ul>					
Intend	ed lear	ning outcomes				
Studen and an going t exercis	Students will be introduced to the main concepts and abstractions of IT security. They learn how to model threats and analyze security of a system critically from the attacker view point. After visiting the lecture students are going to understand the purpose and function of several security technologies, as well as their limitations. The exercises provide some hands-on experience of security flows in software.					
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) + Module	Ü (2) e taugh	t in: German and/or En	glish			
Metho	d of ass	sessment (type, scope, lang	uage — if other than German,	examination offered — if no	t every semester, informati	ion on whether
module is	s creditab	le for bonus)				
written If anno examin prox. 19 Langua credita	examin unced nation c 5 minut age of a ble for	nation (approx. 60 to 1: by the lecturer at the b of one candidate each ( res per candidate). ssessment: German ar bonus	20 minutes). eginning of the course, approx. 20 minutes) or d/or English	the written examina an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	immes)		
Module	e appea	urs in				
Bachel Module	or's de e studie	gree (1 major) Compute es (Bachelor) Computer	r Science (2019) Science (2019)			
Bachelor's Data Scien	with 1 maj ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 47 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module	title				Abbreviation	
Interac	tive Co	mputer Graphics			10-l=lCG-232-m01	
Module	e coord	inator		Module offered by		
holder	of the (	Chair of Computer Scie	nce IX	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	graduate				
Conten	ts					
Compu cifically contem about l jection line wil Accomp	Computer graphics studies methods for digitally synthesising and manipulating visual content. This course spe- cifically concentrates on interactive graphics with an additional focus on 3D graphics as a requirement for many contemporary as well as for novel human-computer interfaces and computer games. The course will cover topics about light and images, lighting models, data representations, mathematical formulations of movements, pro- jection as well as texturing methods. Theoretical aspects of the steps involved in ray-tracing and the raster pipe- line will be complemented by algorithmical approaches for interactive image syntheses using computer systems. Accompanying software solutions will utilise modern graphics packages and languages like OpenGL, GLSL and/					
Intende	ed lear	ning outcomes				
At the e comput active §	end of t ter grap graphic	he course, the student bhics. They will be able s applications and to c	s will have a broad und to implement a promir hoose the right softwa	lerstanding of the un nent variety of these re tool for this task.	derlying theoretical models, to build the	models of ir own inter-
Course	<b>Courses</b> (type, number of weekly contact hours, language — if other than German)					
V (2) +	Ü (2)					
Methoo module is	<b>d of ass</b> creditab	e <b>essment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether
written If anno examin prox. 1 <u>9</u> Langua credita	examin unced ation o 5 minut ge of a ble for	nation (approx. 60 to 1 by the lecturer at the b f one candidate each ( es per candidate). ssessment: German ar bonus	20 minutes). eginning of the course, approx. 20 minutes) or nd/or English	the written examina an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Focuse	s availa	able for students of the	Master's programme l	nformatik (Computer	Science, 120 ECTS of	credits): HCI.
Worklo	ad			·		
150 h						
Teachi	ng cycl	e				
Teachir	ng cycle	e: every year, summer s	semester			
Referre	d to in	LPO I (examination regulati	ons for teaching-degree progra	immes)		
Module	e appea	irs in				
Master Master Master Bachelo Master	's degro 's degro 's degro or's degro 's degro	ee (1 major) Computer ee (1 major) Artificial In ee (1 major) Artificial In gree (1 major) Artificial ee (1 major) Computer	Science (2023) telligence & Extended telligence (2024) Intelligence and Data S Science (2025)	Reality (2024) Science (2024)	z data record Ba-	Dage 40 / 15 4
Data Scienc	ce (2024)		chelor (180 ECTS) Ki	instliche Intelligenz und Data	Science - 2024	page 49 / 154

Module title Abbreviation						
Knowle	edge-b	ased Systems			10-I-WBS-152-m01	
Modul	e coord	linator		Module offered by	<u> </u>	
holder	of the	Chair of Computer Scie	nce VI	Institute of Comput	er Science	
ECTS	Moth	ed of grading		nistitute of comput		
-	Meth					
5	Inume			_		
Duratio	on	Module level	Other prerequisites	5		
1 seme	ester	undergraduate				
Conter	nts					
Founda thods,	ations i knowle	n the following areas: k edge acquisition, learni	nowledge managemei ng, guidance dialogue	nt systems, knowledg , semantic web.	ge representation, so	olving me-
Intend	ed lear	ning outcomes				
The stu system	udents 1s inclu	possess theoretical and ding knowledge formal	d practical knowledge isation and have acqu	for the understanding ired experience in a s	g and design of knov small project.	wledge-based
Course	es (type,	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) +	Ü (2)					
Metho modulo i	d of as	sessment (type, scope, lang	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
module i	s credital	ble for bonus)				
If anno examir prox. 1 Langua credita	ounced nation o 5 minu age of a able for	by the lecturer at the bo of one candidate each ( tes per candidate). ussessment: German ar bonus	eginning of the course, approx. 20 minutes) o Id/or English	, the written examina r an oral examination	tion may be replace in groups of 2 cand	d by an oral lidates (ap-
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	bad					
150 h						
Teachi	ng cyc	<u>م</u>				
	ing cyc					
Doforr	d to in					
S a a ll		<b>LFUT</b> (examination regulation	ons for teaching-degree progra	ammes)		
9 22 II	NI. 3 D					
Modul	e appe	ars in				
Bachel	lor's de lor's de	gree (1 major) Compute	er Science (2015)			
Bachel	lor's de	gree (1 major) Mathema	s Information Systems	(2015)		
Bachel	lor's de	gree (1 major) Compute	itional Mathematics (2	015)		
Bachel	lor's de	gree (1 major) Aerospa	ce Computer Science (2	2015)		
First st	ate exa	mination for the teachi	ng degree Gymnasium	Computer Science (2	2015)	
Bachel	lor's de	gree (1 major) Business	Information Systems	(2016)		
Master	's teac	hing degree Gymnasiur	n MINT Teacher Educat	tion PLUS, Elite Netwo	ork Bavaria (ENB) (2	016)
Supple	ementa	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2016)	
Bachel	lor's de	gree (1 major) Aerospa	ce Computer Science (:	2017)		
Bachel	lor's de	gree (1 major) Compute	er Science (2017)			
Bachelor's Data Scien	with 1 ma	jor Artificial Intelligence and	JMU Würzburg ● gene chelor (180 ECTS) K	erated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 50 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Business Information Systems (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025)

Module	e title				Abbreviation	
Advanc	ed Pro	gramming		-	10-I-APR-172-m01	
Module	e coord	inator		Module offered by		
holder	of the (	Chair of Computer Scie	nce II	Institute of Comput	er Science	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites	i		
1 seme	ster	undergraduate				
Conten	ts					
With th grams. and co- de a se cussed	With the knowledge of basic programming, taught in introductory lectures, it is possible to realize simpler pro- grams. If more complex problems are to be tackled, suboptimal results like long, incomprehensible functions and code duplicates occur. In this lecture, further knowledge is to be conveyed on how to give programs and co- de a sensible structure. Also, further topics in the areas of software security and parallel programming are dis- cussed.					
Intende	ed lear	ning outcomes				
Studen then im allel pr sing.	its leari ipleme ocessii	n advanced programmi nted in multiple langua ng concepts are introdu	ng paradigms especial ages and their efficienc uced culminating in the	ly suited for space a y measured using st use of GPU architect	oplications. Differen andard metrics. In a tures for extremely q	t patterns are ddition, par- uick proces-
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) +	U (2)					
Methoe module is	<b>d of ass</b> s creditab	s <b>essment</b> (type, scope, lang ole for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	on on whether
If anno examin prox. 19 Langua credita	exami unced nation c 5 minut age of a ble for	nation (approx. 60 to 1: by the lecturer at the b of one candidate each ( tes per candidate). ssessment: German ar bonus	20 minutes). eginning of the course, approx. 20 minutes) or nd/or English	the written examina an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulati	ons for teaching-degree progra	ammes)		
§ 22	Nr. 3 b)					
Module	e appea	ars in				
Bachel Bachel Module Master Master Master	Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Module studies (Bachelor) Computer Science (2019) Master's degree (1 major) Nanostructure Technology (2020) Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS Elite Network Bayaria (ENB) (2020)					
Supple	menta	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2020)	
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 52 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Business Information Systems (2020) Master's degree (1 major) Physics International (2020) Master's degree (1 major) Quantum Engineering (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Master's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Business Information Systems (2023) Master's degree (1 major) Quantum Engineering (2024) Master's degree (1 major) Physics International (2024) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Digital Business & Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module	e title				Abbreviation	
Compu	tationa	Il Complexity			10-I-KT-191-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts		<u> </u>			
Comple sumpti thods,	exity m on vers P-NP p	easurements and class sus computation time, roblem, completeness	es, general relationshi determinism versus inc problems, Turing reduc	ps between space ar leterminism, hierarcl tion, interactive proc	nd time classes, men nical theorems, trans of systems.	nory con- slation me-
Intende	ed lear	ning outcomes				
The stu classes determ probler	idents s, gene inism v ns, Tur	possess a fundamenta ral relationships betwe versus indeterminism, ing reduction, interacti	l and applicable knowle en space and time clas nierarchical theorems, ve proof systems.	edge in the areas of o ses, memory consur translation methods,	complexity measure nption versus compl , P-NP problem, com	ments and utation time, pleteness
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) +	Ü (2)					
Method module is	<b>d of ass</b> creditab	<b>sessment</b> (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	on on whether
If anno examin prox. 19 Langua Assess credita	unced ation c 5 minut ge of a ment o ble for	by the lecturer at the b of one candidate each ( tes per candidate). ssessment: German ar ffered: In the semester bonus	eginning of the course, approx. 20 minutes) or nd/or English in which the course is	the written examina an oral examination offered and in the su	tion may be replaced in groups of 2 cand Ibsequent semester	d by an oral idates (ap-
Allocat	ion of I	places				
Additio	nal inf	ormation				
Additio	iiat iiii					
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	immes)		
§ 22	Nr. 3 b)					
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Compute	er Science (2019)			
Master	's teacl	ning degree Gymnasiur	n MINT Teacher Educat	ion PLUS, Elite Netwo	ork Bavaria (ENB) (20	020)
Supple	menta	ry course MINT Teacher	Education PLUS, Elite	Network Bavaria (EN	B) (2020)	
Bachel	or's de	gree (1 major) Compute	er Science and Sustaina	ability (2021)		
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data S	Science (2022)		
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data S	Science (2023)		
Bachel	or's de	gree (1 major) Mathem	atics (2023)			
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data S	science (2024)	data waarid Di	
Bachelor's Data Sciene	witn 1 ma ce (2024)	jor Artificial Intelligence and	chelor (180 ECTS) Ki	instliche Intelligenz und Data	3. data record Ba- Science - 2024	page 54 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module	e title				Abbreviation	
Crypto	graphy	and Data Security			10-I-KD-191-m01	
Module	e coord	inator		Module offered by		
Dean o	f Studi	es Informatik (Compute	er Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Private RSA, Di million	Private key cryptography systems, Vernam one-time pad, AES, perfect security, public key cryptography systems, RSA, Diffie-Hellman, Elgamal, Goldwasser-Micali, digital signature, challenge-response methods, secret sharing, millionaire problem, secure circuit evaluation, homomorphous encryption.					
Intende	ed lear	ning outcomes				
The stu stems, wasser evaluat	dents   Vernar -Micali tion, ho	possess a fundamenta n one-time pad, AES, p , digital signature, cha momorphous encrypti	l and applicable knowle erfect security, public k lenge-response metho on	edge in the areas of ey cryptography, RS d, secret sharing, mi	private key cryptogra A, Diffie-Hellman, El llionaire problem, se	iphy sy- gamal, Gold- ecure circuit
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Gei	man)		
V (2) +	Ü (2)					
Methoo module is	<b>d of ass</b> creditab	<b>eessment</b> (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	t every semester, informati	on on whether
If anno examin prox. 19 Langua Assess	written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate). Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester					
	ion of r					
Allocut						
 Additio	nalinf	ormation				
Auditio						
workto	au					
150 fi						
Teachi	ng cycl	e				
Referre	d to in	LPOI (examination regulati	ons for teaching-degree progra	mmes)		
§ 22	Nr. 3 b)					
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Compute	er Science (2019)			)
waster Supple	s teach	ning degree Gymnasiun v course MINT Teacher	Fducation PLUS Flite	Network Bayaria (FN	ык bavaria (ENB) (20 В) (2020)	J20J
Bachel	or's de	gree (1 major) Compute	er Science and Sustaina	bility (2021)	U) (2020)	
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data 9	Science (2022)		
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data S	Science (2023)		
Bachel	or's de	gree (1 maior) Mathem	atics (2023)			
Bachel	or's de	gree (1 major) Artificial	Intelligence and Data S	Science (2024)		
Bachelor's Data Scienc	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 56 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation	
3D Poii	3D Point Cloud Processing 10-I-3D-152-m01					
Module coordinator				Module offered by		
holder of the Chair of Computer Science XVII Institute of Computer Science						
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts		•			
Laser s d trees mappir	cannin , registi 1g.	g, Kinect and camera mo ration, features, segmen	odels, basic data struc tation, tracking, appli	tures (lists, arrays, c cations for airborne	oc-trees), calculating mapping, applicatio	; normals, k- ns to mobile
Intende	ed leari	ning outcomes				
Studen munica data pr require	ts undente with ocessin ments,	erstand the fundamenta engineers / surveyors / ng and have experienced in terms of memory req	l principles of all aspe CV people / etc. Stud I that real application uirements and in term	ects of 3D point cloud lents are able to solv scenarios are challe is of implementation	d processing and are re problems of mode enging in terms of co issues.	able to com- rn sensor mputational
Course	<b>S</b> (type, n	umber of weekly contact hours,	language — if other than Ger	man)		
V (2) +	Ü (2)					
Metho module is	<b>d of ass</b> creditab	<b>essment</b> (type, scope, langu le for bonus)	age — if other than German, o	examination offered — if no	t every semester, informati	on on whether
If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English						
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	е				
Referre	d to in	LPO I (examination regulation	ns for teaching-degree progra	mmes)		
§ 22 II Nr. 3 b)						
Module appears in						
Bachelor's degree (1 major) Computer Science (2015)						
Bachelor's degree (1 major) Mathematics (2015)						
Bachelor's degree (1 major) Computational Mathematics (2015)						
Bachelor's degree (1 major) Aerospace Computer Science (2015)						
First state examination for the teaching degree Gymnasium Computer Science (2015)						
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Bachel	or's deg	gree (1 major) Aerospace	Science (2017)	.01/)		
Bachelor's	with 1 maj	or Artificial Intelligence and	JMU Würzburg • gener	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 58 / 154
Data Scien	ce (2024)		chelor (180 ECTS) Kü	instliche Intelligenz und Data	Science - 2024	

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Computer Science (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025)

Module title					Abbreviation	
Operating Systems					10-l-BS-191-m01	
Module coordinator				Module offered by		
holder of the Chair of Computer Scienc			nce II	Institute of Comput	er Science	
ECTS Method of grading Only after succ. compl. of module(s)						
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 Seme	ster	undergraduate				
Conten	ts	undergraduate				
Introdu	iction t	n computer systems d		g systems architect	ure principles inter	runt proces-
sing in ry man	operat ageme	ing systems, processes nt, device and file man	s and threads, CPU sch agement, operating sys	eduling, synchronisa stem virtualisation.	tion and communica	ation, memo-
Intend	ed lear	ning outcomes				
The stu	Idents	oossess knowledge an	d practical skills in buil	ding and using esse	ntial parts of operati	ing systems.
Course	<b>S</b> (type, r	umber of weekly contact hour	rs, language — if other than Ge	rman)		
V (2) +	Ü (2)					
Module	e taugh	t in: English				
Metho	d of ass	<b>essment</b> (type, scope, lang	guage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
module is	s creditab	le for bonus)				
examir prox. 19 Langua credita	ation c 5 minut age of a ble for	of one candidate each ( es per candidate). ssessment: German ar bonus	approx. 20 minutes) or nd/or English	an oral examination	in groups of 2 cand	idates (ap-
Allocat	ion of <sub>l</sub>	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulati	ions for teaching-degree progra	ummes)		
Module appears in						
Bachelor's degree (1 major) Computer Science (2019)						
Master's degree (1 major) Nanostructure Technology (2020)						
Master's degree (1 major) Physics (2020)						
Bachelor's degree (1 major) Business Information Systems (2020)						
Master's degree (1 major) Physics International (2020)						
Master's degree (1 major) Quantum Engineering (2020)						
Bachelor's degree (1 major) Aerospace Computer Science (2020)						
Bachelor's degree (1 major) Computer Science and Sustainability (2021)						
Bachel	s uegr or's de	ree (1 major) Quantum	s Information Systems	(2021)		
	<u> </u>			()		
Bachelor's Data Scien	with 1 ma ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. res instliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 60 / 154

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Master's degree (1 major) Quantum Engineering (2024) Master's degree (1 major) Physics International (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation		
Computer Architecture				10-I-RAK-152-m01			
Module coordinator				Module offered by			
Dean of Studies Informatik (Computer S			er Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. cor	mpl. of module(s)			
	nume	rical grade					
Duratio	n	Modulo loval	level Other prorequisites				
1 Seme							
Conten	its 						
ling, ca	tion se iches, v	t architectures, comma vector processors, mult	nd processing through i-core processors.	i pipelining, statical a	and dynamic instruct	tion schedu-	
Intend	ed lear	ning outcomes					
The stu compil	idents ers and	master the most impor I operating systems.	ant techniques to des	ign fast computers as	s well as their intera	ction with	
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
V (2) +	Ü (2)						
Metho module is	<b>d of ass</b> s creditab	<b>Sessment</b> (type, scope, lang ole for bonus)	uage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether	
lf anno examir prox. 1 Langua credita	unced nation c 5 minut age of a ble for	by the lecturer at the b of one candidate each ( tes per candidate). ssessment: German ar bonus	eginning of the course, approx. 20 minutes) o id/or English	, the written examina r an oral examinatior	tion may be replace i in groups of 2 cand	d by an oral idates (ap-	
Allocat	ion of <b>j</b>	places					
Additio	onal inf	ormation					
Worklo	ad						
150 h							
Teachi	ng cycl	Δ					
reaction	ing cyce	C					
 Deferme							
Referre		LPUT (examination regulati	ons for teaching-degree progra	ammes)			
§ 69   Nr. 1 c): Rechnerarchitektur							
Module	e appea	ars in					
Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Computational Mathematics (2015)							
Bachelor's degree (1 major) Aerospace Computer Science (2015)							
First state examination for the teaching degree Gymnasium Computer Science (2015)							
Master's degree (1 major) Physics (2016) Master's teaching degree Cympacium MINT Teacher Education DULIS, Elite Naturaly Deverie (END) (2 - (1)							
Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016) Bachelor's degree (1 major) Aerospace Computer Science (2017)							
Bachel	or's de	gree (1 major) Compute	er Science (2017)	/)			
Bachel	or's de	gree (1 major) Compute	er Science (2019)				
Bachologe	with a m-	ior Artificial Intelligence and	MIL Militahuwa a com	arated 18-lup 2025 + over	a data record Pa	nage 62 / 451	
Data Scien	ce (2024)	joi Aitinciai Intenigence anu	chelor (180 ECTS) K	ünstliche Intelligenz und Data	a Science - 2024	page 02 / 154	

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Master's degree (1 major) Physics (2020) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Master's degree (1 major) Physics International (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Master's degree (1 major) Physics International (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation		
Control Principles of Modern Communication Systems				10-I-SKS-242-m01			
Module coordinator				Module offered by			
holder	of the (	Chair of Computer Scienc	e III	III Institute of Computer Science			
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	Contents						
<ul> <li>C</li> <li>M</li> <li>B</li> <li>M</li> <li>H</li> <li>C</li> <li>S</li> <li>C</li> <li>Ir</li> </ul>	<ul> <li>Control Mechanisms of Modern Communication Systems</li> <li>Multimedia Networking</li> <li>Broadband Access Networks</li> <li>Mobile Communication Systems</li> <li>Home Access Networks</li> <li>Current trends such as Internet of Things (IoT)</li> <li>Software Defined Networking (SDN)</li> <li>Control mechanisms implemented and deployed on the Internet</li> <li>Introduction of analytical performance evaluation</li> </ul>						
The stu dern co measur analytic	dents p mmun rement cal perf	possess advanced knowl ication systems and are a setups. In addition, stud formance evaluation.	edge regarding the st able to apply it to eva ents have gathered i	ructure, architecture luate systems and p nsights of the basic	e and control mecha rotocols within simu methodologies in th	nisms of mo- ılations and e field of	
Course	<b>S</b> (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (2) +	Ü (2)						
Methoo module is	<b>d of ass</b> creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, informati	ion on whether	
written If annou examin prox. 19 Langua credita	examin unced ation o 5 minut ge of a ble for	nation (approx. 60 to 120 by the lecturer at the beg of one candidate each (ap ces per candidate). ssessment: German and, bonus	minutes). inning of the course, oprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced in groups of 2 cand	d by an oral idates (ap-	
Allocat	ion of p	olaces	,				
			,				
Additio	nal inf	ormation					
Worklo	ad						
150 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Module Bachele Bachele	e studie or's deg or's deg	es (Bachelor) Computer S gree (1 major) Artificial In gree (1 major) Aerospace	cience (2019) telligence and Data S Computer Science (2	cience (2024) 025)			
Bachelor's	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gener chelor (180 FCTS) Kü	ated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- Science - 2024	page 64 / 154	





Bachelor's degree (1 major) Computer Science (2025)

Module title					Abbreviation
Practic	Practice/Job-oriented Internship Computer Science 10-I-BPI-242-mo1				
Module coordinator				Module offered by	
Dean o	f Studie	es Informatik (Computer	Science)	Institute of Comput	er Science
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)	
5	(not) s	successfully completed			
Duratio	on	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Practica spondi must b	al expe ng prof e comp	rience is an important co essions. To pass this mo leted.	mpetence for applica dule, an internship, e	ation-oriented aspected aspected aspected aspected as the second state of the second s	ts of many sciences or the corre- c environment or in the industry,
Intende	ed learn	ning outcomes			
The par qualific	rticipan ations	ts will learn how potentian will be expected from the	al future jobs and em em.	ployments will be ch	naracterized and what kind of
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
P (1)					
Methoo module is	<b>d of ass</b> s creditab	s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
placem Langua	ent rep ge of a	oort (5 to 10 pages) ssessment: German and,	/or English		
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
block p	laceme	ent, duration 4 to 6 week	5		
Worklo	ad				
150 h					
Teaching cycle					
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)					
Module	e appea	ars in			
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)					

Module title					Abbreviation	
Algorithmic Graph Theory				10-I-AGT-152-m01		
Module coordinator			Module offered by			
holder	ofthe	Chair of Computer Scier	nce l	Institute of Comput	er Science	
ECTS Method of grading Only after succ. compl. of mo			npl. of module(s)			
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
We discuss typical graph problems: We solve round trip problems, calculate maximal flows, find matchings and colourings, work with planar graphs and find out how the ranking algorithm of Google works. Using the examples of graph problems, we also become familiar with new concepts, for example how we model problems as linear programs or how we show that they are fixed parameter computable.						
Intend	ed lear	ning outcomes				
The stu cipants course	idents s are ab , stude	are able to model typica ole to decide which tool nts learn in detail how t	al problems in comput from the course helps o estimate the run tim	er science as graph p solve a given graph e of given graph algc	problems. In addition problem algorithmic prithms.	n, the parti- cally. In this
Course	<b>S</b> (type, r	number of weekly contact hours	s, language — if other than Ge	rman)		
V (2) +	Ü (2)					
Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus) written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (ap- prox. 15 minutes per candidate).						
credita	ble for	bonus				
Allocat	ion of <sub>l</sub>	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)		
§ 22 II Nr. 3 b)						
Module appears in						
Bachelor's degree (1 major) Computer Science (2015)						
Bachelor's degree (1 major) Mathematics (2015)						
Bachelor's degree (1 major) Computational Mathematics (2015)						
Bachelor's degree (1 major) Aerospace Computer Science (2015)						
rnst state examination for the leaching degree dynnasium Computer Science (2015) Master's teaching degree Gymnasium MINT Teacher Education PLUS Elite Network Bayaria (ENR) (2016)						
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)						
Bachelor's degree (1 major) Aerospace Computer Science (2017)						
Bachel	or's de	gree (1 major) Compute	r Science (2017)			
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 67 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Computer Science (2019) Module studies (Bachelor) Computer Science (2019) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) First state examination for the teaching degree Realschule Computer Science (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation	
Selected Basics of Computer Science       10-I-GI-152-m01					10-l-Gl-152-m01	
Module coordinator				Module offered by		
Dean of	fStudie	es Informatik (Computer S	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	numei	rical grade		-		
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate	, ,			
Conten	ts					
Selecte	d tonic	s in computer science				
Intende	d lear	and outcomes				
The stu	dents a	are able to understand so	olutions to fundamen	tal problems in com	puter science and to transfer	
Course	S (type n	umber of weekly contact hours	anguage — if other than Ger	man)		
V(a) +	ü (2)					
Methoo module is	l of ass	essment (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
If annoi examin prox. 15 Langua credital	unced l ation o ; minut ge of a ole for	by the lecturer at the beg f one candidate each (ap es per candidate). ssessment: German and, bonus	inning of the course, oprox. 20 minutes) or /or English	the written examina an oral examination	tion may be replaced by an oral in groups of 2 candidates (ap-	
Allocat	ion of p	olaces				
Additio	nal info	ormation				
Worklo	ad					
150 h						
Teachir	ng cycle	9				
Referre	d to in	<b>LPO I</b> (examination regulations	s for teaching-degree progra	mmes)		
			0.001,00			
Module appears in						
Bachelo	or's deg	gree (1 major) Computer S	Science (2015)			
Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's degree (1 major) Computer Science (2019)						
Module studies (Bachelor) Computer Science (2019)						
Bachelor's degree (1 major) Computer Science and Sustainability (2021)						
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)					
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachelo	or's deg	gree (1 major) Mathemati	cs (2023)			
Bachelo	or's deរ្	gree (1 major) Artificial In	telligence and Data S	icience (2024)		
Bachelo	or's deរ្	gree (1 major) Computer S	Science (2025)			
Bachelo	or's deg	gree (1 major) Computer S	Science and Sustaina	idility (2025)		





# subsidiary subject

(ECTS credits)





Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

# Mathematics

(ECTS credits)

Module title					Abbreviation			
Introduction to Discrete Mathematics for students of other subjects					10-M-DIMaf-152-m01			
Module coordinator				Module offered by				
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics			
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)				
10	nume	rical grade						
Duratio	n	Module level	Other prerequisites					
1 seme	ster	undergraduate						
Conten	ts							
Technic error-co	ques fro prrectin	om combinatorics, introd g codes.	uction to graph theor	y (including applicat	tions), cryptographic methods,			
Intende	ed learı	ning outcomes						
The stu levant p realises	dent is proof te s the so	acquainted with the fun- echniques, is able to app cope of applications of di	damental concepts a ly methods from num screte structures.	nd results in discrete ber theory and algel	e mathematics, masters the re- bra to discrete mathematics and			
Course	<b>S</b> (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)				
V (4) +	Ü (2)							
Methoo module is	<b>l of ass</b> creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether			
b) oral ( c) oral ( Langua credital	examin examin ge of a ble for	ation of one candidate e ation in groups (groups c ssessment: German and, bonus	ach (15 to 30 minutes) of 2, 10 to 15 minutes /or English	6) or per candidate)				
Allocat	ion of p	olaces						
Additio	nal inf	ormation						
Worklo	ad							
300 h								
Teachir	ng cycl	e						
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)				
Module appears in								
Bachelor's degree (1 major) Computer Science (2015)								
Bachelor's degree (1 major) Computer Science (2017)								
Bachelor's degree (1 major) Computer Science (2019)								
Bachelo	Bachelor's degree (1 major) Computer Science and Sustainability (2021)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)								
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2023)				
	u saeg ar's day	gree (1 major) Aftificial In groo (1 major) Computer (	Reingence and Data S	ocience (2024)				
Bachel	or's de	gree (1 major) Computer S	Science and Sustaina	bility (2025)				
שמרוכוסי ש מכצובב (ד וומוסו) כסוויףמנבו שנוכווכב מווע ששגומוומשווונץ (בסבש)								
Module title				Abbreviation				
---	--	--	--	---	---------------------------------------	----------------	--	--
Numeri	Numerical Mathematics 1 for students of other subjects				10-M-NUM1af-152-n	n01		
Module	e coord	inator		Module offered by				
Dean o	f Studi	es Mathematik (Mathema	atics)	Institute of Mathem	natics			
ECTS	Metho	od of grading	Only after succ. con	Only after succ. compl. of module(s)				
10	nume	rical grade		· · · · · · · · · · · · · · · · · · ·				
Duratio	n	Module level	Other prerequisites					
Duratio	ctor.	undergreduete						
Conten	ts							
Solutio ons, in	n of sy terpola	stems of linear equations tion with polynomials, sp	s and curve fitting pro plines and trigonome	blems, nonlinear eq tric functions, nume	uations and system rical integration.	s of equati-		
Intende	ed lear	ning outcomes						
The stu to prac	ident is tical pr	acquainted with the fun oblems and knows abou	damental concepts a t their typical fields o	nd methods in nume f application.	erical mathematics, a	applies them		
Course	<b>S</b> (type, r	number of weekly contact hours, l	language — if other than Gei	rman)				
V (4) +	Ü (2)							
Method module is	d of ass	<b>Sessment</b> (type, scope, langua Ile for bonus)	ge — if other than German,	examination offered — if no	ot every semester, informati	ion on whether		
b) oral c) oral Langua credita	en examir examir examin ige of a ble for	nation of one candidate e ation in groups (groups of ssessment: German and, bonus	ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	s) or per candidate)				
Allocat	ion of <b>j</b>	olaces						
Additio	onal inf	ormation						
Worklo	ad							
200 h								
Teeshi								
Teacini	ig tytt	e						
Referre	ed to in	<b>LPOI</b> (examination regulation	s for teaching-degree progra	immes)				
Module	e appea	ars in						
Bachel	or's de	gree (1 major) Computer (	Science (2015)					
Bachel	or's de	gree (1 major) Physics (20	015)					
Bachel	or's de	gree (1 major) Nanostruci	ture Technology (201	5)				
Bachel	or's de	gree (1 major) Aerospace	Computer Science (2	2015)				
Bachel	or's de	gree (1 major) Functional	Materials (2015)					
Bachel	ors de or's do	gree (1 major) Aerospace	Computer Science (2	2017)				
Bachol	or's de	gree (1 major) Computer . groo (1 major) Computer !	Science $(2017)$					
Bachel	or's de	gree (1 major) Computer . gree (1 major) Physics (20	(2019)					
Bachel	or's de	gree (1 major) Nanostruct	ture Technology (202	0)				
Bachel	or's de	gree (1 major) Aerosnace	Computer Science (202	~, 2020)				
Bachel	or's de	gree (1 major) Functional	Materials (2021)					
Bachelor's Data Scien	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 73 / 154		



Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title				Abbreviation	
Stochastics 1 for students of other subjects				10-M-STO-1af-152-m01	
Module	coord	inator		Module offered by	
Dean of	fStudie	es Mathematik (Mathema	atics)	Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts	0			
Combin continu chastic varianc	natorics Ious dis Indepe e, limit	s, Laplace models, select stributions: normal distri endence, elementary con theorems: law of large n	ed discrete distributi bution, random varia ditional probability, c umbers, central limit	ons, elementary mea ble, distribution func- characteristics of dis theorem.	asure and integration theory, ction, product measures and sto- tributions: expected value and
Intende	ed learr	ning outcomes			
The stu practica	dent is al prob	acquainted with fundam lems and knows about th	iental concepts and n ie typical fields of apj	nethods in stochasti olication.	cs, applies these methods to
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (4) +	Ü (2)				
Methoo module is	<b>l of ass</b> creditab	e <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
a) writte b) oral e c) oral e Langua credital	en exar examin examin ge of a ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and/ bonus	ach (15 to 30 minutes) ach (15 to 30 minutes of 2, 10 to 15 minutes /or English	nosen) or 5) or per candidate)	
Allocat	ion of p	olaces			
Additio	nal inf	ormation			
Worklo	ad				
300 h					
Teachir	ng cycl	9			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	
Module	appea	rs in			
Bachelo	or's deg	gree (1 major) Computer S	Science (2015)		
Bachelo	or's deg	gree (1 major) Computer S	Science (2017)		
Bachelo	or's de	gree (1 major) Computer S	Science (2019)		
Bachel	or's deg	gree (1 major) Computer S	Science and Sustaina	Dility (2021)	
Bachel	or's deg	gree (1 major) Artificial In	telligence and Data S	cience (2022)	
Bachelo	or's dea	gree (1 major) Artificial In	telligence and Data S	cience (2023)	
Bachelo	or's de	gree (1 major) Computer S	Science (2025)	······	
Bachelo	or's deg	gree (1 major) Computer S	Science and Sustaina	bility (2025)	

Module title				Abbreviation	
Introdu	ction l	nto Number Theory for st	udents of other subj	ects	10-M-ZTHaf-152-m01
Module	coord	inator		Module offered by	
Dean of	Studie	es Mathematik (Mathema	atics)	Institute of Mathem	natics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 semes	ster	undergraduate			
Content	S				
Element tests an forms, c	tary pro d metl liopha	operties of divisibility, pr nods for factorisation, str ntine approximation and	ime numbers and pri ructure of the residue diophantine equatio	me number factorisa class rings, theory c ns.	ation, modular arithmetics, prime of quadratic remainder, quadratic
Intende	d learr	ning outcomes			
The stud ploy the	dent is basic	acquainted with the fund methods and proof tech	damental concepts a niques independently	nd methods of numt y.	per theory. He/she is able to em-
Courses	<b>6</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (4) + Ü	Ĵ (2)				
<b>Method</b> module is	<b>of ass</b> creditab	e <b>essment</b> (type, scope, langua; le for bonus)	ge — if other than German, e	examination offered — if no	ot every semester, information on whether
b) oral e c) oral e Languag creditab	examin examin ge of a ole for	ation of one candidate e ation in groups (groups c ssessment: German and/ bonus	ach (15 to 30 minutes) of 2, 10 to 15 minutes or English	s) or per candidate)	
Allocati	on of p	olaces			
Additio	nal info	ormation			
Workloa	ad				
300 h					
Teachin	g cycl	9			
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)	
Module	appea	irs in			
Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)					
Bachelo	or's deg	gree (1 major) Computer S	Science (2025)	Cicilico (2024)	

Ordinary Differential Equations for students of other subjects 10-M-DGLaf-152-mo	1			
Module coordinator Medule offered by				
module cooluliator   module offered by	Module offered by			
Dean of Studies Mathematik (Mathematics) Institute of Mathematics				
ECTS Method of grading Only after succ. compl. of module(s)				
10 numerical grade				
Duration Module level Other prorequisites				
Contents				
Existence and uniqueness theorem; continuous dependence of solutions on initial values; systems of ferential equations; matrix exponential series; linear differential equations of higher order.	of linear dif-			
Intended learning outcomes				
The student is acquainted with the fundamental concepts and methods of the theory of ordinary different equations. He/she is able to apply these methods to practical problems.	erential			
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)				
V (4) + Ü (2)				
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, informatio module is creditable for bonus)	on on whether			
b) oral examination (approx. 90 to 180 minutes, usually chosen) of c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus				
Allocation of places				
Additional information				
Workload				
300 h				
Referred to III LFOT (examination regulations for teaching-degree programmes)				
Module appears in				
Bachelor's degree (1 major) Computer Science (2015)				
Bachelor's degree (1 major) Aerospace Computer Science (2015)				
Bachelor's degree (1 major) Functional Materials (2015)				
Bachelor's degree (1 major) Aerospace Computer Science (2017)				
Bachelor's degree (1 major) Computer Science (2017)				
Bachelor's degree (1 major) Computer Science (2019)				
Bachelor's degree (1 major) Functional Materials (2021)				
Bachelor's degree (1 major) Computer Science and Sustainability (2021)				
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)				
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)				
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)				
Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-	page 77 / 154			

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title				Abbreviation			
Optimi	zation	for Machine Learning			10-M-OML-222-mo	1	
Module	Module coordinator M				Aodule offered by		
Dean o	of Studi	es Mathematik (Mathe	matics)	Institute of Mathem	natics		
FCTS	Moth	od of grading	Only after succ. con	nl of module(s)			
	Metho	vicel stade					
10							
Duration Module level Other prerequisites							
1 seme	ster	undergraduate					
Conten	Its						
Linear learnin	prograr g probl	nming, quadratic prog ems such as support v	ramming, convex optim ector machines.	ization, first order m	ethods, application	to machine	
Intend	ed lear	ning outcomes					
The stu tical m	udent is achine	acquainted with the re learning problems, bot	elevant methods in opt th theoretically and nur	imization and is able nerically.	e to apply these met	hods to prac-	
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)			
V (4) +	Ü (2)						
Module	e taugh	t in: German and/or En	glish				
Metho module is	<b>d of ass</b> s creditab	<b>Sessment</b> (type, scope, lang le for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informat	ion on whether	
c) oral Langua Assess credita	examin age of a ment o ble for	ation in groups (group ssessment: German ar ffered: In the semester bonus	s of 2, 10 to 15 minutes nd/or English in which the course is	offered and in the su	ubsequent semester		
Allocat	ion of <b>j</b>	olaces					
Additio	onal inf	ormation					
Worklo	ad						
300 1							
Teachi	ng cycl	e					
Referre	ed to in	LPO I (examination regulation	ons for teaching-degree progra	ammes)			
Module	e appea	ars in					
Bachel	or's de	gree (1 major) Economa	athematics (2022)				
Bachelor's degree (1 major) Mathematical Data Science (2022)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)							
exchange program Mathematics (2023)							
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachel	or's de	gree (1 major) Economa	athematics (2023)				
Bachel	orsde	gree (1 major) Mathem	atical Physics (2024)				
Bachel	s uegr	ee (1 major) Physics In	athomatics (2024)				
Bachol	or's de	gree (1 major) Economi gree (1 major) Artificial	Intelligence and Data (	Science (2024)			
Dachel	or s ue	Sice (I majoi) Aitmicial	intelligence and Dald 3	Juienile (2024)			
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. re instliche Intelligenz und Data	g. data record Ba- a Science - 2024	page 79 / 154	



Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title				Abbreviation	
Introdu	Introduction to Mathematical Logic				10-M-LOGP-232-m01
Module	e coord	inator		Module offered by	
				Institute of Mathem	atics
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
10	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster				
Conten	ts				
Intende	ed learn	ning outcomes			
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (4) + Module	Ü (2)	tin. Cormon and lor Engli	ich		
Mothod					t a constant a fatta da constituir a constituir a
module is	creditab	le for bonus)	ge — If other than German, e	examination offered — if no	t every semester, information on whether
a) writt b) oral c) oral Langua Assess credita	en exar examin examin ge of a ment o ble for	nination (approx. 90 to 1 ation of one candidate e ation in groups (groups c ssessment: German and/ ffered: In the semester in bonus	80 minutes, usually o ach (15 to 30 minutes of 2, 10 to 15 minutes or English which the course is	chosen) or 5) or per candidate) offered and in the su	ıbsequent semester
Allocat	ion of p	olaces			
Additio	nal info	ormation			
Worklo	ad				
300 h					
Teachi	ng cycl	e			
Referre	d to in	LPOI (examination regulations	for teaching-degree progra	mmes)	
Module	e appea	in and the second se			
Bachel	or's deg	gree (1 major) Mathemati	cal Data Science (20:	22)	
Bachel	or's deg	gree (1 major) Mathemati	cal Physics (2024)	cionco (aco ()	
васпе	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)				





# **Physics** (ECTS credits)

Module title				Abbreviation			
Introdu	Introduction to Physics for Students of other Disciplines				11-EFNF-152-m01		
Modul	e coord	inator		Module offered by			
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	and Astronomy		
FCTS	Metho	nd of grading	Only after succ. cor	after succ. compl. of module(s)			
7	numo	rical grado					
/	lune						
2 seme	ester	undergraduate					
Conten	Its						
Fundar physic:	nentals s.	s of mechanics, vibratio	on theory, thermodyna	nics, optics, science	of electricity, atomic	and nuclear	
Intend	ed lear	ning outcomes					
The stu fields i	ıdents a n physi	are able to identify fund cs. They are able to ap	damental physical con ply simple formulae in	texts. They are able t order to analyse and	o assign them to cor evaluate these cont	responding texts.	
Course	<b>S</b> (type, r	number of weekly contact hour	s. language — if other than Ge	rman)			
V (/) +	V (2)			,			
Motho		occmont (time areas land	if a the set have Courses	in-tion offered if a			
module i	<b>u ui as:</b> s creditab	le for bonus)	uage — Ir other than German,	examination offered — if no	ot every semester, informati	on on whether	
writton	ovami	nation (60 to 120 minu	 toc)				
Alland							
Allocat	tion of p	Diaces					
Additio	onal inf	ormation					
accord nex 1 to	ing to § o the Al	2 para. 2 sentence 2 A POLmCh and No. 4 of a	POLmCh in conjunctio	n with No. I 2nd lette 1	er d) and No. I 1st lett	er d) of an-	
Worklo	ad						
210 h							
Teachi	ng cycl	ρ					
reaction	ing cyce						
Referre	ed to in	<b>LPOI</b> (examination regulati	ons for teaching-degree progra	ammes)			
Module	e appea	ars in					
Bachel	or's de	gree (1 major) Biology (	(2011)				
Bachel	or's de	gree (1 major) Chemist	ry (2010)				
Bachel	or's de	gree (1 major) Psycholo	ogy (2010)				
Bachel	or's de	gree (1 major, 1 minor)	Pedagogy (2013)				
Bachel	or's de	gree (1 major, 1 minor)	Political and Social Sti	Idles (2013)			
Bachel	orsae	gree (1 major, 1 minor)	Russian Language and	Culture (2008)			
Magist	Bachelor's degree (2 majors) Special Education (2009)						
First st	Magister Theologiae Catholic Theology (2013)						
First st	FIRST State examination for the teaching degree Gymnasium English (2009)						
First st	ate exa	mination for the teachi	ng degree Gymnasium	Chemistry $(2009)$			
First st	ate exa	mination for the teachi	ng degree Gymnasium	Geography (2009)			
First st	ate exa	mination for the teachi	ng degree Gymnasium	French Studies (200	9)		
First st	ate exa	mination for the teachi	ng degree Gymnasium	German (2009)			
First st	ate exa	mination for the teachi	ng degree Gymnasium	History (2009)			
Bachelor's Data Scien	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 83 / 154	

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

First state examination for the teaching degree Gymnasium Greek Philology (2009) First state examination for the teaching degree Gymnasium Computer Science (2009) First state examination for the teaching degree Gymnasium Italian Studies (2009) First state examination for the teaching degree Gymnasium Catholic Theology (2009) First state examination for the teaching degree Gymnasium Latin Philology (2009) First state examination for the teaching degree Gymnasium Mathematics (2012) First state examination for the teaching degree Gymnasium Mathematics (2009) First state examination for the teaching degree Gymnasium Music (2009) First state examination for the teaching degree Gymnasium Physics (2009) First state examination for the teaching degree Gymnasium Russian (2009) First state examination for the teaching degree Gymnasium Social Science (2009) First state examination for the teaching degree Gymnasium Spanish Studies (2009) First state examination for the teaching degree Gymnasium Science of Sport (2009) First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009) Bachelor's degree (2 majors) English and American Studies (2009) Bachelor's degree (2 majors) German Language and Literature (2013) Bachelor's degree (1 major) Biochemistry (2015) Bachelor's degree (1 major) Chemistry (2015) Bachelor's degree (1 major) Geography (2015) Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Food Chemistry (2015) Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Musicology (2015) Bachelor's degree (1 major) Physics (2015) Bachelor's degree (1 major) Psychology (2015) Bachelor's degree (1 major) Business Management and Economics (2015) Bachelor's degree (1 major) Nanostructure Technology (2015) Bachelor's degree (1 major) Biomedicine (2015) Bachelor's degree (1 major) Music Education (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Political and Social Studies (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Academic Speech Therapy (2015) Bachelor's degree (1 major) Indology/South Asian Studies (2015) Bachelor's degree (1 major, 1 minor) Egyptology (2015) Bachelor's degree (1 major, 1 minor) Pedagogy (2015) Bachelor's degree (1 major, 1 minor) History (2015) Bachelor's degree (1 major, 1 minor) Musicology (2015) Bachelor's degree (1 major, 1 minor) Philosophy (2015) Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (1 major, 1 minor) Ancient World (2015) Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015) Bachelor's degree (1 major, 1 minor) Theological Studies (2015) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015) Bachelor's degree (1 major, 1 minor) German Language and Literature (2015) Bachelor's degree (2 majors) Egyptology (2015) Bachelor's degree (2 majors) Pedagogy (2015) Bachelor's degree (2 majors) Protestant Theology (2015) Bachelor's degree (2 majors) Musicology (2015) Bachelor's degree (2 majors) Philosophy (2015) Bachelor's degree (2 majors) Special Education (2015) Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015) Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Bapage 84 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (2 majors) Latin Philology (2015) Bachelor's degree (2 majors) Music Education (2015) Bachelor's degree (2 majors) Philosophy and Religion (2015) Bachelor's degree (2 majors) Theological Studies (2015) Bachelor's degree (2 majors) Political and Social Studies (2015) Bachelor's degree (2 majors) Russian Language and Culture (2015) Bachelor's degree (2 majors) Greek Philology (2015) Bachelor's degree (2 majors) European Ethnology (2015) Bachelor's degree (2 majors) Indology/South Asian Studies (2015) First state examination for the teaching degree Gymnasium English (2015) First state examination for the teaching degree Gymnasium Biology (2015) First state examination for the teaching degree Gymnasium Chemistry (2015) First state examination for the teaching degree Gymnasium Geography (2015) First state examination for the teaching degree Gymnasium French Studies (2015) First state examination for the teaching degree Gymnasium German (2015) First state examination for the teaching degree Gymnasium History (2015) First state examination for the teaching degree Gymnasium Greek Philology (2015) First state examination for the teaching degree Gymnasium Computer Science (2015) First state examination for the teaching degree Gymnasium Italian Studies (2015) First state examination for the teaching degree Gymnasium Catholic Theology (2015) First state examination for the teaching degree Gymnasium Latin Philology (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Physics (2015) First state examination for the teaching degree Gymnasium Russian (2015) First state examination for the teaching degree Gymnasium Social Science (2015) First state examination for the teaching degree Gymnasium Spanish Studies (2015) First state examination for the teaching degree Gymnasium Science of Sport (2015) Bachelor's degree (2 majors) Geography (2015) Bachelor's degree (2 majors) French Studies (2015) Bachelor's degree (2 majors) History (2015) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015) Bachelor's degree (2 majors) German Language and Literature (2015) Bachelor's degree (1 major) Mathematical Physics (2016) First state examination for the teaching degree Gymnasium Music (2015) First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015) Bachelor's degree (1 major, 1 minor) French Studies (2016) Bachelor's degree (2 majors) French Studies (2016) Bachelor's degree (1 major, 1 minor) Italian Studies (2016) Bachelor's degree (2 majors) Italian Studies (2016) Bachelor's degree (1 major, 1 minor) Spanish Studies (2016) Bachelor's degree (2 majors) Spanish Studies (2016) Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor's degree (1 major) Business Information Systems (2016) First state examination for the teaching degree Gymnasium French Studies (2016) First state examination for the teaching degree Gymnasium Italian Studies (2016) First state examination for the teaching degree Gymnasium Spanish Studies (2016) Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major, 1 minor) English and American Studies (2016) Bachelor's degree (2 majors) English and American Studies (2016) First state examination for the teaching degree Gymnasium English (2016) Bachelor's degree (1 major) Media Communication (2016) Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Bapage 85 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Food Chemistry (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor's degree (1 major) Biology (2017) Bachelor's degree (1 major, 1 minor) Geography (2017) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Chemistry (2017) Bachelor's degree (1 major, 1 minor) Museology and material culture (2017) Bachelor's degree (1 major) Economathematics (2017) Bachelor's degree (1 major) Games Engineering (2017) Bachelor's degree (1 major) Computer Science (2017) First state examination for the teaching degree Gymnasium Greek Philology (2018) Bachelor's degree (1 major) Media Communication (2018) Bachelor's degree (1 major) Biomedicine (2018) Bachelor's degree (1 major) Human-Computer Systems (2018) Bachelor's degree (2 majors) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Digital Humanities (2018) Bachelor's degree (2 majors) Digital Humanities (2018) First state examination for the teaching degree Gymnasium Physics (2018) Bachelor's degree (1 major) Computer Science (2019) First state examination for the teaching degree Gymnasium Mathematics (2019) Bachelor's degree (1 major, 1 minor) English and American Studies (2019) Bachelor's degree (1 major) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (2 majors) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Management and Economics (2019) Bachelor's degree (1 major) Modern China (2019) Bachelor's degree (1 major) Food Chemistry (2019) Bachelor's degree (1 major) Biomedicine (2020) Bachelor's degree (1 major) Pedagogy (2020) Bachelor's degree (1 major) Political and Social Studies (2020) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020) Bachelor's degree (2 majors) European Ethnology (2020) Bachelor's degree (2 majors) Political and Social Studies (2020) Bachelor's degree (2 majors) Special Education (2020) Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major, 1 minor) Museology and material culture (2020) First state examination for the teaching degree Gymnasium Physics (2020) Bachelor's degree (1 major, 1 minor) Pedagogy (2020) Bachelor's degree (2 majors) Pedagogy (2020) First state examination for the teaching degree Gymnasium Political and Social Studies (2020) Bachelor's degree (1 major) Psychology (2020) Bachelor's degree (1 major) Biology (2021) Magister Theologiae Catholic Theology (2021) Bachelor's degree (2 majors) History (2021) Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major, 1 minor) History (2021) First state examination for the teaching degree Gymnasium History (2021) Bachelor's degree (1 major) Media Communication (2021) Bachelor's degree (2 majors) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) English and American Studies (2021) Bachelor's degree (2 majors) English and American Studies (2021) First state examination for the teaching degree Gymnasium English (2021) Bachelor's degree (1 major) Functional Materials (2021) First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021) Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (2 majors) Special Education (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Human-Computer Systems (2022) Bachelor's degree (1 major, 1 minor) Museology and material culture (2022) Bachelor's degree (1 major) Biochemistry (2022) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022) Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022) Bachelor's degree (1 major, 1 minor) Ancient World (2022) Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022) Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022) First state examination for the teaching degree Gymnasium Russian (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) First state examination for the teaching degree Gymnasium English (2023) First state examination for the teaching degree Gymnasium Geography (2023) Bachelor's degree (1 major) European Law (2023) Bachelor's degree (1 major, 1 minor) English and American Studies (2023) Bachelor's degree (2 majors) English and American Studies (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) Special Education (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023) First state examination for the teaching degree Gymnasium German (2024) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (2 majors) German Language and Literature (2024) Bachelor's degree (1 major, 1 minor) German Language and Literature (2024) IMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-Bachelor's with 1 major Artificial Intelligence and page 87 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Music Education (2024) Bachelor's degree (2 majors) Music Education (2024) Bachelor's degree (1 major, 1 minor) Music Education (2024) Bachelor's degree (1 major) Indology/South Asian Studies (2024) Bachelor's degree (2 majors) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Ancient World (2024) Bachelor's degree (2 majors) Digital Humanities (2024) Bachelor's degree (1 major, 1 minor) Digital Humanities (2024) Bachelor's degree (1 major) Midwifery (2024) Bachelor's degree (2 majors) Greek Philology (2024) Bachelor's degree (2 majors) Latin Philology (2024) First state examination for the teaching degree Gymnasium Latin Philology (2024) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Business Management and Economics (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) First state examination for the teaching degree Gymnasium English (2024) First state examination for the teaching degree Gymnasium History (2024) First state examination for the teaching degree Gymnasium Greek Philology (2024) Bachelor's degree (1 major) Human-Computer-Interaction (2024) Bachelor's degree (2 majors) Art Education (2024) Bachelor's degree (1 major) Digital Business & Data Science (2024) Bachelor's degree (1 major) Classics (2024) Bachelor's degree (1 major) Diversity, Ethics and Religions (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) (2025) Bachelor's degree (1 major) Food Chemistry (2025) Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025) Bachelor's degree (1 major) Pedagogy (2025) Bachelor's degree (2 majors) Pedagogy (2025) Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Academic Speech Therapy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2025) First state examination for the teaching degree Gymnasium German (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (2 majors) German Language and Literature (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025) First state examination for the teaching degree Gymnasium (2025)

Module title				Abbreviation		
Labora	tory Co	urse Physics for Stude	nts of other Discipline	S	11-PFNF-152-m01	
Module	e coord	inator		Module offered by	Module offered by	
Manag	ing Dire	ector of the Institute of	Applied Physics	Faculty of Physics a	nd Astronomy	
ECTS	Metho	od of grading	Only after succ. cor	npl. of module(s)	,	
2	(not)	successfully completed				
Duratic	<u>[(ii0t) :</u>		Other prorequisites			
Duratio						
Conten	its		<u> </u>			
Simple tic resc	experi onance	ments in the fields of m atomic and nuclear phy	echanics, vibration th sics, imaging method	eory, thermodynamic s.	cs, optics, X-rays, nu	clear magne-
Intend	ed lear	ning outcomes				
The stu perime of error derstar and im	idents ints. Th rs in ex nding o aging n	have recognised and ur ey can conduct simple o periments. They are abl f physical phenomena a nethods as well as their	nderstood physical cor experiments in the lab e to compile a protocc and know the basic ide r applications, especia	ntexts on the basis of oratory. They are abl of for experimental pr eas and ways of func ally in the field of bio	f the implementatior e to identify and ass ocedures. They have tioning of different n medicine.	n of own ex- ess sources e a basic un- neasuring
Course	<b>S</b> (type, r	number of weekly contact hours	s, language — if other than Ge	rman)		
P (4)						
Method module is a) prac prox. 9 Each ex	d of ass s creditab tical as o minu xperimo	sessment (type, scope, lang le for bonus) signment with oral test tes). ent comprises preparati	uage — if other than German, (approx. 15 minutes, o ion, performance and o	examination offered — if no during experiments) evaluation. Test as w	and b) written exami ell as performance c	ion on whether ination (ap- of experi-
Allocat	can ead	ch be repeated once.				
Only as	s part o	f pool of general transfe	erable skills (ASO): 10	places (lottery)		
Additio	onal inf	ormation				
accord nex 1 to	ing to § o the Al	2 para. 2 sentence 2 A POLmCh and No. 4 of ar	POLmCh in conjunctio	n with No. I 2nd lette າ	er d) and No. I 1st lett	ter d) of an-
Worklo	ad					
90 h						
Teachi	ng cvcl	e				
	0.7	2				
Referre	d to in	<b>IPOI</b> (examination regulation	ons for teaching-degree progra	ammes)		
Module	e appea	urs in				
Bachel	Bachelor's degree (1 major) Biology (2011)					
Bachel	Bachelor's degree (1 major) Chemistry (2010)					
Bachel	Bachelor's degree (1 major) Psychology (2010)					
Bachel	or's de	gree (1 major, 1 minor)	Pedagogy (2013)			
Bachel	or's de	gree (1 major, 1 minor) l	Political and Social Stu	idies (2013)		
Bachel	or's de	gree (1 major, 1 minor)   groo (2 majors) Special	Kussian Language and	Culture (2008)		
Magict		gree (2 majors) Special	Equivalion (2009) $r_{\rm v}$ (2012)			
First st	er meu ate eva	mination for the teaching	sy (2013) ng degree Gymnasium	English (2000)		
1			actice cynnasidin			
Bachelor's Data Scien	with 1 ma ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) K	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- a Science - 2024	page 89 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

First state examination for the teaching degree Gymnasium Biology (2009) First state examination for the teaching degree Gymnasium Chemistry (2009) First state examination for the teaching degree Gymnasium Geography (2009) First state examination for the teaching degree Gymnasium French Studies (2009) First state examination for the teaching degree Gymnasium German (2009) First state examination for the teaching degree Gymnasium History (2009) First state examination for the teaching degree Gymnasium Greek Philology (2009) First state examination for the teaching degree Gymnasium Computer Science (2009) First state examination for the teaching degree Gymnasium Italian Studies (2009) First state examination for the teaching degree Gymnasium Catholic Theology (2009) First state examination for the teaching degree Gymnasium Latin Philology (2009) First state examination for the teaching degree Gymnasium Mathematics (2012) First state examination for the teaching degree Gymnasium Mathematics (2009) First state examination for the teaching degree Gymnasium Music (2009) First state examination for the teaching degree Gymnasium Physics (2009) First state examination for the teaching degree Gymnasium Russian (2009) First state examination for the teaching degree Gymnasium Social Science (2009) First state examination for the teaching degree Gymnasium Spanish Studies (2009) First state examination for the teaching degree Gymnasium Science of Sport (2009) First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2009) Bachelor's degree (2 majors) English and American Studies (2009) Bachelor's degree (2 majors) German Language and Literature (2013) Bachelor's degree (1 major) Biochemistry (2015) Bachelor's degree (1 major) Chemistry (2015) Bachelor's degree (1 major) Geography (2015) Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Food Chemistry (2015) Bachelor's degree (1 major) Mathematics (2015) Bachelor's degree (1 major) Musicology (2015) Bachelor's degree (1 major) Physics (2015) Bachelor's degree (1 major) Psychology (2015) Bachelor's degree (1 major) Business Management and Economics (2015) Bachelor's degree (1 major) Nanostructure Technology (2015) Bachelor's degree (1 major) Biomedicine (2015) Bachelor's degree (1 major) Music Education (2015) Bachelor's degree (1 major) Computational Mathematics (2015) Bachelor's degree (1 major) Political and Social Studies (2015) Bachelor's degree (1 major) Functional Materials (2015) Bachelor's degree (1 major) Academic Speech Therapy (2015) Bachelor's degree (1 major) Indology/South Asian Studies (2015) Bachelor's degree (1 major, 1 minor) Egyptology (2015) Bachelor's degree (1 major, 1 minor) Pedagogy (2015) Bachelor's degree (1 major, 1 minor) History (2015) Bachelor's degree (1 major, 1 minor) Musicology (2015) Bachelor's degree (1 major, 1 minor) Philosophy (2015) Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (1 major, 1 minor) Ancient World (2015) Bachelor's degree (1 major, 1 minor) Philosophy and Religion (2015) Bachelor's degree (1 major, 1 minor) Theological Studies (2015) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2015) Bachelor's degree (1 major, 1 minor) Russian Language and Culture (2015) Bachelor's degree (1 major, 1 minor) German Language and Literature (2015) Bachelor's degree (2 majors) Egyptology (2015) Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Bapage 90 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

## UNIVERSITÄT WÜRZBURG

Bachelor's degree (2 majors) Pedagogy (2015) Bachelor's degree (2 majors) Protestant Theology (2015) Bachelor's degree (2 majors) Musicology (2015) Bachelor's degree (2 majors) Philosophy (2015) Bachelor's degree (2 majors) Special Education (2015) Bachelor's degree (2 majors) Pre- and Protohistoric Archaeology (2015) Bachelor's degree (2 majors) Latin Philology (2015) Bachelor's degree (2 majors) Music Education (2015) Bachelor's degree (2 majors) Philosophy and Religion (2015) Bachelor's degree (2 majors) Theological Studies (2015) Bachelor's degree (2 majors) Political and Social Studies (2015) Bachelor's degree (2 majors) Russian Language and Culture (2015) Bachelor's degree (2 majors) Greek Philology (2015) Bachelor's degree (2 majors) European Ethnology (2015) Bachelor's degree (2 majors) Indology/South Asian Studies (2015) First state examination for the teaching degree Gymnasium English (2015) First state examination for the teaching degree Gymnasium Biology (2015) First state examination for the teaching degree Gymnasium Chemistry (2015) First state examination for the teaching degree Gymnasium Geography (2015) First state examination for the teaching degree Gymnasium French Studies (2015) First state examination for the teaching degree Gymnasium German (2015) First state examination for the teaching degree Gymnasium History (2015) First state examination for the teaching degree Gymnasium Greek Philology (2015) First state examination for the teaching degree Gymnasium Computer Science (2015) First state examination for the teaching degree Gymnasium Italian Studies (2015) First state examination for the teaching degree Gymnasium Catholic Theology (2015) First state examination for the teaching degree Gymnasium Latin Philology (2015) First state examination for the teaching degree Gymnasium Mathematics (2015) First state examination for the teaching degree Gymnasium Physics (2015) First state examination for the teaching degree Gymnasium Russian (2015) First state examination for the teaching degree Gymnasium Social Science (2015) First state examination for the teaching degree Gymnasium Spanish Studies (2015) First state examination for the teaching degree Gymnasium Science of Sport (2015) Bachelor's degree (2 majors) Geography (2015) Bachelor's degree (2 majors) French Studies (2015) Bachelor's degree (2 majors) History (2015) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2015) Bachelor's degree (2 majors) German Language and Literature (2015) Bachelor's degree (1 major) Mathematical Physics (2016) First state examination for the teaching degree Gymnasium Music (2015) First state examination for the teaching degree Gymnasium Music Education, Advanced Studies (2015) Bachelor's degree (1 major, 1 minor) French Studies (2016) Bachelor's degree (2 majors) French Studies (2016) Bachelor's degree (1 major, 1 minor) Italian Studies (2016) Bachelor's degree (2 majors) Italian Studies (2016) Bachelor's degree (1 major, 1 minor) Spanish Studies (2016) Bachelor's degree (2 majors) Spanish Studies (2016) Bachelor's degree (1 major) Romanic Languages (French/Italian) (2016) Bachelor's degree (1 major) Romanic Languages (French/Spanish) (2016) Bachelor's degree (1 major) Romanic Languages (Italian/Spanish) (2016) Bachelor's degree (1 major) Business Information Systems (2016) First state examination for the teaching degree Gymnasium French Studies (2016) First state examination for the teaching degree Gymnasium Italian Studies (2016) IMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-Bachelor's with 1 major Artificial Intelligence and page 91 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

# UNIVERSITÄT WÜRZBURG

First state examination for the teaching degree Gymnasium Spanish Studies (2016) Bachelor's degree (1 major) Games Engineering (2016) Bachelor's degree (1 major, 1 minor) English and American Studies (2016) Bachelor's degree (2 majors) English and American Studies (2016) First state examination for the teaching degree Gymnasium English (2016) Bachelor's degree (1 major) Media Communication (2016) Bachelor's degree (1 major) Food Chemistry (2016) Bachelor's degree (1 major, 1 minor) Digital Humanities (2016) Bachelor's degree (1 major) Biology (2017) Bachelor's degree (1 major, 1 minor) Geography (2017) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) History of Medieval and Modern Art (2017) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2017) Bachelor's degree (1 major) Aerospace Computer Science (2017) Bachelor's degree (1 major) Biochemistry (2017) Bachelor's degree (1 major) Chemistry (2017) Bachelor's degree (1 major, 1 minor) Museology and material culture (2017) Bachelor's degree (1 major) Economathematics (2017) Bachelor's degree (1 major) Games Engineering (2017) Bachelor's degree (1 major) Computer Science (2017) First state examination for the teaching degree Gymnasium Greek Philology (2018) Bachelor's degree (1 major) Media Communication (2018) Bachelor's degree (1 major) Biomedicine (2018) Bachelor's degree (1 major) Human-Computer Systems (2018) Bachelor's degree (2 majors) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Classical Archaeology (2018) Bachelor's degree (1 major, 1 minor) Digital Humanities (2018) Bachelor's degree (2 majors) Digital Humanities (2018) First state examination for the teaching degree Gymnasium Physics (2018) Bachelor's degree (1 major) Computer Science (2019) First state examination for the teaching degree Gymnasium Mathematics (2019) Bachelor's degree (1 major, 1 minor) English and American Studies (2019) Bachelor's degree (1 major) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (2 majors) Indology/South Asian Studies (2019) Bachelor's degree (1 major) Business Management and Economics (2019) Bachelor's degree (1 major) Modern China (2019) Bachelor's degree (1 major) Food Chemistry (2019) Module studies (Bachelor) Orientierungsstudien (2020) Bachelor's degree (1 major) Biomedicine (2020) Bachelor's degree (1 major) Pedagogy (2020) Bachelor's degree (1 major) Political and Social Studies (2020) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major, 1 minor) Political and Social Studies (2020) Bachelor's degree (2 majors) European Ethnology (2020) Bachelor's degree (2 majors) Political and Social Studies (2020) Bachelor's degree (2 majors) Special Education (2020) Bachelor's degree (1 major) Physics (2020) Bachelor's degree (1 major) Nanostructure Technology (2020) Bachelor's degree (1 major) Mathematical Physics (2020) Bachelor's degree (1 major) Aerospace Computer Science (2020) Bachelor's degree (1 major, 1 minor) Museology and material culture (2020) First state examination for the teaching degree Gymnasium Physics (2020) IMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-Bachelor's with 1 major Artificial Intelligence and Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

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# UNIVERSITÄT WÜRZBURG

Bachelor's degree (1 major, 1 minor) Pedagogy (2020) Bachelor's degree (2 majors) Pedagogy (2020) First state examination for the teaching degree Gymnasium Political and Social Studies (2020) Bachelor's degree (1 major) Psychology (2020) Bachelor's degree (1 major) Biology (2021) Magister Theologiae Catholic Theology (2021) Bachelor's degree (2 majors) History (2021) Bachelor's degree (1 major, 1 minor) History (2021) First state examination for the teaching degree Gymnasium History (2021) Bachelor's degree (1 major) Media Communication (2021) Bachelor's degree (2 majors) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) Theological Studies (2021) Bachelor's degree (1 major, 1 minor) English and American Studies (2021) Bachelor's degree (2 majors) English and American Studies (2021) First state examination for the teaching degree Gymnasium English (2021) Bachelor's degree (1 major) Functional Materials (2021) First state examination for the teaching degree Gymnasium Philosophy and Ethics (2021) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (2 majors) Comparative Indo-European Linguistics (2021) Bachelor's degree (1 major) Food Chemistry (2021) Bachelor's degree (1 major) Quantum Technology (2021) Bachelor's degree (2 majors) Special Education (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Human-Computer Systems (2022) Bachelor's degree (1 major, 1 minor) Museology and material culture (2022) Bachelor's degree (1 major) Biochemistry (2022) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Mathematical Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) First state examination for the teaching degree Gymnasium Philosophy and Ethics (2022) Bachelor's degree (2 majors) Ancient Near Eastern Archaeology (2022) Bachelor's degree (1 major, 1 minor) Ancient World (2022) Bachelor's degree (2 majors) Ancient Near Eastern Studies (2022) Bachelor's degree (1 major) Franco-German studies: language, culture, digital competence (2022) First state examination for the teaching degree Gymnasium Russian (2023) First state examination for the teaching degree Gymnasium Mathematics (2023) First state examination for the teaching degree Gymnasium English (2023) First state examination for the teaching degree Gymnasium Geography (2023) Bachelor's degree (1 major) European Law (2023) Bachelor's degree (1 major, 1 minor) English and American Studies (2023) Bachelor's degree (2 majors) English and American Studies (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major, 1 minor) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) History of Medieval and Modern Art (2023) Bachelor's degree (2 majors) Special Education (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's with 1 major Artificial Intelligence and JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Bapage 93 / 154 Data Science (2024) chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (2 majors) European Ethnology/Empiric Cultural Studies (2023) First state examination for the teaching degree Gymnasium German (2024) Bachelor's degree (1 major) Mathematical Physics (2024) Bachelor's degree (2 majors) German Language and Literature (2024) Bachelor's degree (1 major, 1 minor) German Language and Literature (2024) Bachelor's degree (1 major) Music Education (2024) Bachelor's degree (2 majors) Music Education (2024) Bachelor's degree (1 major, 1 minor) Music Education (2024) Bachelor's degree (1 major) Indology/South Asian Studies (2024) Bachelor's degree (2 majors) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Indology/South Asian Studies (2024) Bachelor's degree (1 major, 1 minor) Ancient World (2024) Bachelor's degree (2 majors) Digital Humanities (2024) Bachelor's degree (1 major, 1 minor) Digital Humanities (2024) Bachelor's degree (1 major) Midwifery (2024) Bachelor's degree (2 majors) Greek Philology (2024) Bachelor's degree (2 majors) Latin Philology (2024) First state examination for the teaching degree Gymnasium Latin Philology (2024) Bachelor's degree (1 major) Business Information Systems (2024) Bachelor's degree (1 major) Economathematics (2024) Bachelor's degree (1 major) Business Management and Economics (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) First state examination for the teaching degree Gymnasium English (2024) First state examination for the teaching degree Gymnasium History (2024) First state examination for the teaching degree Gymnasium Greek Philology (2024) Bachelor's degree (1 major) Human-Computer-Interaction (2024) Bachelor's degree (2 majors) Art Education (2024) Bachelor's degree (1 major) Digital Business & Data Science (2024) Bachelor's degree (1 major) Classics (2024) Bachelor's degree (1 major) Diversity, Ethics and Religions (2024) Bachelor's degree (1 major) Functional Materials (2025) Bachelor's degree (1 major) (2025) Bachelor's degree (1 major) Food Chemistry (2025) Bachelor's degree (1 major, 1 minor) European Ethnology/Empiric Cultural Studies (2025) Bachelor's degree (1 major) Pedagogy (2025) Bachelor's degree (2 majors) Pedagogy (2025) Bachelor's degree (1 major) Economathematics (2025) Bachelor's degree (1 major) Academic Speech Therapy (2025) Bachelor's degree (1 major, 1 minor) Pedagogy (2025) Bachelor's degree (1 major) Games Engineering (2025) Bachelor's degree (2 majors) Sport Science (Focus on health and Pedagogics in Movement) (2025) First state examination for the teaching degree Gymnasium German (2025) Bachelor's degree (1 major) Aerospace Computer Science (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (2 majors) German Language and Literature (2025) First state examination for the teaching degree Gymnasium Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025) First state examination for the teaching degree Gymnasium (2025)





# Economics

(ECTS credits)

Module title         Abbreviation						
Organiz	Organization 12-EBWL-G-212-mo1					1
Module	coord	inator		Module offered by		
holder Organis	of the C sation	Chair for Human Resour	ce Management and	Faculty of Managen	nent and Economics	
ECTS	Metho	d of grading	Only after succ. con	npl. of module(s)		
5	numer	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	1 semester undergraduate					
Conten	Contents					
The lect that are there an econom arch are	The lecture Organisation covers the basic methodological, empirical, and institutional concepts of management that are necessary for the further study of the subject. More specifically, it gives answers to the question why there are organisations. In addition, different goals, strategies, and structures of enterpreises as well as their economic and societal environment are discussed. Finally, selected empirical findings from organisation research are presented together with the basic tool kit for empirical methods and approaches.					
Intende	ed learr	ning outcomes				
Studen empiric	ts shou al findi	Ild be able to understan Ings in organisation sci	nd, discuss and apply ence.	basic theories, econ	ometric techniques a	as well as
Course	<b>S</b> (type, n	umber of weekly contact hours	s, language — if other than Ge	rman)		
V (2) +	T (2)					
Methoo module is	<b>l of ass</b> creditab	<b>essment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
written	examir	nation (approx. 60 minu	utes) d / ar English			
Langua	ge of a					
Allocal	ion oi p	naces				
Additio	nal inf	ormation				
Additio	natinit					
Worklo	ad					
150 h	au					
Teachir		<b>a</b>				
Teachir	or cycle	e winter semester				
Peferre	d to in		one for togehing domesting	ummoc)		
				annies)		
Module	30000	rs in				
Master	s dogra	a (1 maior) China Busi	ness and Economics (a	2021)		
Bachel	or's deg	gree (1 major) Business	Information Systems	(2021)		
Bachel	or's deg	gree (1 major) Economa	thematics (2021)	()		
Bachel	or's deg	gree (1 major) Business	Management and Eco	nomics (2021)		
Bachel	Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021)					
Bachel	or's deg	gree (1 major) Economa	thematics (2022)	Science (acce)		
Master	s degr	gree (1 major) Artificial See (1 major) Media Ente	intelligence and Data S ertainment (2022)	Science (2022)		
Master	s degre	ee (1 major) Psvchology	of digital media (2022)	2)		
exchan	ge prog	gram Business Manage	ment and Economics (	2022)		
Bachel	or's deg	gree (1 major) Artificial	Intelligence and Data S	Science (2023)		
Bachelor's Data Scienc	with 1 maj :e (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 96 / 154

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation	
E-Busir	E-Business 12-Ebus-F-212-mo1					
Module	Module coordinator			Module offered by		
holder of the Chair of Information Systems Engineering			tems Engineering	Faculty of Managen	nent and Economics	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	<u>n</u>		Other prerequisites			
	stor	undorgraduato				
1 Seine	1 sellester   undergraduate					
Conten	its	1 1 11 11			• • • •	
ses as ly beca ced on theorie and e-c	E-business is a comprehensive, digital processing of business transactions between private and public enterpri- ses as well as institutions and their clients on global public and private networks such as the internet. Precise- ly because euphoria for e-business has waned considerably in recent years, a lot of emphasis is now being pla- ced on introducing such solutions in a user-oriented way. This lecture will first discuss the supporting economic theories and will then describe and analyse individual solutions such as e-procurement, e-shop, e-marketplace and e-community in detail					
Intende	ed lear	ning outcomes				
The mc (i) E-Pro (ii) E-SI (iii) E-N (iv) E-C	odule p ocurem hop Marketp	rovides students with k lent blace nity	nowledge about:			
Course	<b>S</b> (type, 1	number of weekly contact hours	, language — if other than Ge	rman)		
V (2) +	T (2)					
Metho module is	<b>d of as:</b> s creditat	<b>Sessment</b> (type, scope, lang ole for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether
a) writt b) term c) term d) oral Langua	en exa paper paper examir age of a	mination (approx. 60 m (approx. 15 pages) or (approx. 10 pages) and nation in groups of up to assessment: German an	inutes) or presentation (approx. o 3 candidates (approx d/or English	10 minutes); (weigh . 10 minutes per can	ted 2:1) or didate)	
Allocat	ion of	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Teachi	ng cycl	e. summer semester				
Poforro	d to in		no for too ching dogroo progr			
Keleffe				annies)		
Module		are in				
Module	e appea	ars III	and Francisc (			
Bachel	s uegi or's de	gree (1 major) Clilla Dush	Information Systems	(2021)		
Bachel	or's de	gree (1 major) Economa	thematics (2021)			
Bachel	or's de	gree (1 major) Business	Management and Eco	nomics (2021)		
Bachel	or's de	gree (1 major, 1 minor) l	Business Management	and Economics (Mir	10r, 2021)	
Bachel	or's de	gree (1 major) Economa	thematics (2022)			
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) K	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- Science - 2024	page 98 / 154

#### Julius-Maximilians-UNIVERSITÄT WÜRZBURG

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Master's degree (1 major) Media Entertainment (2022) Master's degree (1 major) Psychology of digital media (2022) exchange program Business Management and Economics (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title				Abbreviation		
Manage	ement	& Digital Transformatio	n		12-MDT-232-m01	
Module	coord	inator		Module offered by		
holder of the Junior Professorship of Applied Microecor mics, esp. Human-Machine Interaction			Applied Microecono- n	Faculty of Managem	nent and Economics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 semester undergraduate						
Conten	ts					
The lect ment in (micro-) tion. Th cies, on aspects	The lecture Management and Digital Transformation offers a comprehensive introduction to the role of manage- ment in the context of the digital transformation of companies. Basic management concepts are taught from a (micro-)economic perspective and linked to the challenges, opportunities, and strategies of digital transforma- tion. The lecture focuses on the organizational architecture and the distribution of decision-making competen- cies, on the use of machine learning for management decisions and the associated risks, as well as on strategic					
Intende	ed learn	ning outcomes				
Student thinking technol dividua ment de	Students learn how the digital transformation affects organizations and their architecture. Problem-oriented thinking in strategic decision-making is encouraged to evaluate when and to what extent the application of new technologies can deliver value. They will become familiar with how incentives shape economic outcomes for in- dividuals and firms. Furthermore, they will be able to apply basic concepts of game theory to strategic manage-					
Courses	<b>5</b> (type, n	umber of weekly contact hours	, language — if other than Gei	rman)		
V (2) + l Module	Ü (2) taugh	t in: German and/or Eng	glish			
Method module is	l of ass creditab	s <b>essment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informati	on on whether
a) writte b) oral e Langua credital	en exar examin ge of a ole for	nination (approx. 60 m ation in groups of up to ssessment: German an bonus	inutes) or 9 3 candidates (approx d/or English	. 15 minutes per can	didate)	
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo	ad					
150 h						
Teachir	ng cycl					
leachin	ig cycle	e: winter semester				
Referre	a to in	LPU I (examination regulation	ons for teaching-degree progra	immes)		
		•				
Module	appea	ITS IN	Managamant and F	nomics (2015)		
Bachelo Bachelo Bachelo Bachelo	or's deg or's deg or's deg or's deg or's deg	gree (1 major) Business gree (1 major) Economa gree (1 major) Business gree (1 major, 1 minor) B gree (1 major) Business	thematics (2015) Information Systems ( Business Management Information Systems (	(2015) and Economics (Mir (2016)	10r, 2015)	
Bachelor's v Data Scienc	with 1 maj :e (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- Science - 2024	page 100 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Economathematics (2017) Bachelor's degree (1 major) Business Information Systems (2019) Bachelor's degree (1 major) Business Management and Economics (2019) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2019) Bachelor's degree (1 major) Business Information Systems (2020) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Ausiness Management and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title				Abbreviation		
Accoun	Accounting 12-ExtUR-G-212-mo1					1
Module	e coord	inator		Module offered by		
holder	of the (	hair of Business Mana	gement and Business	Faculty of Managem	nent and Economics	
Taxatio	n		Sement and Business			
ECTS	Metho	od of grading	Only after succ. con	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 competer undergraduate						
Conton	51C1	undergraduate				
	<u></u>	(				<b> </b>
hle-ent	urse of	rers an introduction to i	the fundamentals of fire	ancial accounting, I	ncluding the technic	JUE OF DOU-
ties and	d eauit	v according to German	commercial law.			5et5, 1100111-
Intende	ed lear	ning outcomes				
Studen	ts acou	uire a basic understand	ing of the fundamental	ls of financial accour	nting They are able t	to arrange
reprodu	ice and	apply this knowledge,	, i.e. they are able to so	olve simple accounti	ng problems.	o ununge,
Course	S (type, n	umber of weekly contact hours	, language — if other than Gei	rman)		
$V(2) + \frac{1}{2}$	T (2)	,				
Methor	l of ass	essment (type scope lang	uage — if other than German	examination offered — if no	t every semester informati	ion on whether
module is	creditab	le for bonus)			a every semester, mormat	on on whether
written	examiı	nation (approx. 60 mini	utes)			
Langua	ge of a	ssessment: German an	d/or English			
Allocati	ion of p	olaces				
Additio	nal inf	ormation				
Worklo						
150 h	<u>au</u>					
Teeshir		-				
		e				
Teachir	ng cycle	e: winter semester				
Referre	d to in	LPO I (examination regulation	ons for teaching-degree progra	immes)		
Module	e appea	irs in				
Master'	's degr	ee (1 major) China Busi	ness and Economics (2	2021)		
Bachelo	or's de	gree (1 major) Business	Information Systems (	(2021)		
Bachelo	or's de	gree (1 major) Economa	ithematics (2021)	• ( )		
Bachel	or's deg	gree (1 major) Business	Management and Eco	nomics (2021)		
Bachel	ors deg	gree (1 major, 1 minor) i	business Management	and Economics (wir	101, 2021)	
Bachol	Bachelor's degree (1 major) Economathematics (2022)					
ovchan	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)					
Bachel	or's de	gree (1 maior) Artificial	Intelligence and Data 9	Science (2023)		
Bachel	or's de	gree (1 major) Mathema	atics (2023)			
Bachel	or's de	gree (1 major) Business	Information Systems (	(2023)		
Bachelo	or's de	gree (1 major) Economa	thematics (2023)			
Bachelo	or's de	gree (1 major) Business	Management and Eco	nomics (2023)		
Bachelor's Data Scienc	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reş instliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 102 / 154



Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation		
Managerial Accounting					12-IntUR-G-212-m01		
Module coordinator				Module offered by			
holder of the Chair of Business Management, Controlling Faculty of and Accounting				Faculty of Managem	anagement and Economics		
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
5 numerical grade							
Duration Module level		Other prerequisites					
1 semester undergraduate			-				
Contents							
Content: This course offers an introduction to aims and methods of managerial accounting (cost accounting). Outline of syllabus: 1. Managerial accounting and financial accounting 2. Managerial accounting: basic terms							
<ul> <li>3. Different types of costs</li> <li>4. Cost centre accounting based on total costs</li> <li>5. Job costing based on total costs</li> <li>6. Cost centre accounting and job costing based on direct/variable costs</li> <li>7. Budgeting and cost-variance analysis</li> <li>8. Cost-volume-profit analysis</li> <li>9. Cost information and operating decisions</li> </ul>							
Reading: Coenenberg/Fischer/Günther: Kostenrechnung und Kostenanalyse, Stuttgart. Friedl/Hofmann/Pedell: Kostenrechnung. Eine entscheidungsorientierte Einführung. (most recent editions)							
Intende	ed learı	ning outcomes					
After completing the course "Management Accounting and Control", the students will be able to (i) set out the responsibilities of the company's internal accounting and control; (ii) define the central concepts of internal enterprise computing restriction and control and assign case studies the terms; (iii) apply the basic methods of internal corporate accounting and control on a full and cost base to idealized ca- se studies of medium difficulty that calculate relevant costs and benefits and take on this basis a reasoned deci- sion							
Courses	<b>S</b> (type, n	number of weekly contact hours, l	anguage — if other than Ger	man)			
V (2) +	T (2)						
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
written examination (approx. 60 minutes) Language of assessment: German and/or English							
Allocation of places							
Additional information							
Workload							
150 h							

#### **Teaching cycle**

Teaching cycle: summer semester

Referred to in LPO I (examination regulations for teaching-degree programmes)

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#### Module appears in

Master's degree (1 major) China Business and Economics (2021) Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Attificial Intelligence and Economics (2023) Bachelor's degree (1 major) Attificial Intelligence and Economics (2023) Bachelor's degree (1 major) Attificial Intelligence and Economics (2023) Bachelor's degree (1 major) Attificial Intelligence and Economics (2023) Bachelor's degree (1 major) Attificial Intelligence and Data Science (2024)

Module title					Abbreviation		
Supply, Production and Operations Management					12-BPL-G-212-m01		
Module coordinator				Module offered by	Module offered by		
holder of the Chair of Business Management and Industrial Faculty of Management and Economics							
Manage	ement						
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester		undergraduate					
Conten	ts		- <b>I</b>				
This course will provide students with an overview of fundamental processes in procurement, production and lo- gistics and the related corporate functions as well as a model-based introduction to related planning procedu- res.						ction and lo- g procedu-	
Intende	ed learr	ning outcomes					
The stu rate pro develop	dents v ocurem ping an	vill be able to describe ent, production and log d applying basic plann	and discuss the objec sistics as well as their i ing models in these fie	tives and major proc nterdependencies. F elds.	esses in the domain furthermore, they are	s of corpo- e capable of	
Course	<b>S</b> (type, n	umber of weekly contact hours	, language — if other than Ger	rman)			
V (2) + <sup>-</sup>	T (2)						
module is creditable for bonus) written examination (approx. 60 minutes) Language of assessment: German and/or English							
Allocal		haces					
Additio	nalinf	ormation					
Additio							
Worklo							
450 h	au						
Teachir		•					
Teaching cycle							
Deferme				<b>`</b>			
Referre	a to in	<b>LPUI</b> (examination regulation	ons for teaching-degree progra	immes)			
		•					
Module	e appea						
Master's degree (1 major) China Business and Economics (2021)							
Bachelor's degree (1 major) business mormation systems (2021) Bachelor's degree (1 major) Economathematics (2021)							
Bachelor's degree (1 major) Economication Matter (2021)							
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021)							
Bachelor's degree (1 major) Economathematics (2022)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)							
exchange program Business Management and Economics (2022)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)							
Bachelor's degree (1 major) Mathematics (2023)							
Bachel	Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Economathematics (2023)						
		siee (1 majoi) Econoliia	(2023)				
Bachelor's Data Scienc	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 106 / 154	



Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation		
Investment and Finance					12-I&F-G-212-m01		
Module coordinator				Module offered by			
holder	holder of the Chair of Business Management and Corporate Faculty of Management and Economics						
Finance	Finance						
ECTS	Metho	od of grading	Only after succ. compl. of module(s)				
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 semester		undergraduate					
Conten	ts						
Conten	t:						
This co	urse of	fers an introduction to	principles of financial I	nathematics, severa	l methods of capital	budgeting	
and pri	nciples	of financial economic	S.				
Outline	of sylla	abus:					
1. Princ	iples o	f financial mathematic	S				
2. Fund	amenta	al concepts	so in one commodity w	orld under cortainty			
4. Prob	lems of	f investment and finance	ce in one commodity w	orld under certainty orld under uncertain	tv		
5. Probl	lems of	investment and finance	ce in many commoditie	s world under uncert	ainty		
6. Capi	tal mar	ket and corporate fina	ncing in Germany				
Intende	ed learr	ning outcomes					
After co	mpleti	ng the course "Principl	es of Investments and	Finance", the studen	ts will be able		
(i) to ur	idersta	nd the fundamentals in	n financial mathematic	s and solve several p	problems, e.g. via the	e PV ap-	
(ii) to a	, ddress	the central problems i	n intertemporal allocat	ion given different ca	apital market scenar	ios;	
(iii) to b	oudget	and calculate the optir	nal useful life given sta	tic and dynamic inve	estment approaches	under the	
conside	eration	of several other invest	ment opportunities and	d the capital market	scenario, especially	the influence	
of taxes.							
Courses (type, number of weekly contact hours, language — if other than German)							
V (2) +	1 (2)						
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether							
written examination (approx. 60 minutes)							
Language of assessment: German and/or English							
Allocation of places							
Additional information							
Workload							
150 h							
Teaching cycle							
Teaching cycle: winter semester							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Master's degree (1 major) China Business and Economics (2021)							
Bachelor's Data Scienc	with 1 maj ce (2024)	or Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- Science - 2024	page 108 / 154	
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Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021) Bachelor's degree (1 major) Economathematics (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) exchange program Business Management and Economics (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Antificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Antificial Intelligence and Economics (2023) Bachelor's degree (1 major) Antificial Intelligence and Economics (2023) Bachelor's degree (1 major) Antificial Intelligence and Economics (2023) Bachelor's degree (1 major) Antificial Intelligence and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Economics (2023)

Module title					Abbreviation		
Marketing					12-Mark-G-212-mo	L	
Module	coord	inator		Module offered by	<u>.</u>		
holder of ting	of the (	Chair of Business Admi	nistration and Marke-	Faculty of Managen	nent and Economics		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Descrip In this r Conten With th plained	ition nodule t: e stake l and ex	e, students will acquire holder approach as a s xemplified in the 5 clas	the theoretical founda starting point, the basic sical steps: situation a	tions of market-orier c design of market-o nalysis, objectives, s	nted management. riented managemen strategies, tools and	t will be ex- l control-	
ling. Th al purch sed on Outline	e cours hasing a conjo of sylla	se will focus not only of behaviour. A case stuc bint analysis will provic abus:	n the behavioural appro ly introducing students le students with deepe	baches of consumer to the fundamental r insights into the to	behaviour but also o principles of market pic.	on industri- : research ba-	
2. Expla 3. Fund 4. Strat 5. Corpo	anation amenta egic ma orate s	arketing; marketing to ocial responsibility ver	business management our ols sus creating shared val	ue			
Reading Foscht, Wiesba Hombu Unterne Hombu	g: T. / Sw den 20 rg, Ch.: ehmens rg, Ch.:	voboda, B.: Käuferverh 11. Grundlagen des Mark sführung, 4th revised a Grundlagen des Mark	alten: Grundlagen Pe etingmanagements: Eir Ind exp. ed., Wiesbader etingmanagements: Eir	rspektiven Anwend nführung in Strategie n 2012. nführung in Strategie	dungen, 4th revised e, Instrumente, Umse e, Instrumente, Umse	and exp. ed., etzung und etzung und	
Kroeber Meffert zepte	r-Riel, \ , H. / B Instru	N. /Weinberg, P.: Kons urman, Ch / Kirchgeorg mente Praxisbeispiel	umentenverhalten, 9th g, M.: Marketing Grun e, 11th revised and exp	ed., Munich 2009. dlagen marktorientio ed., Wiesbaden 20	erter Unternehmens 12.	führung: Kon-	
4th ed., Meyer, Wiesba	, Stuttg M.: Ök den 19	art 2010. onomische Organisatio 95.	on der Industrie: Netzwo	erkarrangements zw	ischen Markt und Ur	iternehmung,	
New Yo Simon, baden :	Porter, M. E.: Wettbewerbsvorteile Spitzenleistungen erreichen und behaupten, 8th ed., Campus Frankfurt / New York 2014. (Original: Porter, M.: Competitive Advantage, New York 1985.) Simon, H. / Fassnacht, M.: Preismanagement, Strategie Analyse Entscheidung Umsetzung, 3rd ed., Wies- baden 2009.						
Intende	ed learr	ning outcomes					
The students have a basic understanding of business management and are able to classify the knowledge syste- matically. In addition, they can use the acquired knowledge solve and identify the conventional problem fields of business management.							
Course	<b>S</b> (type, n	umber of weekly contact hour	s, language — if other than Ger	rman)			
V (2) +	T (2)						
Bachelor's Data Scienc	with 1 maj :e (2024)	or Artificial Intelligence and	JMU Würzburg • gener chelor (180 ECTS) Kü	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 110 / 154	

Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether
module is creditable for bonus)
written examination (approx. 60 minutes)
Language of assessment: German and/or English
Allocation of places
Additional information
Workload
150 h
Teaching cycle
Teaching cycle: summer semester
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)
Module appears in
Master's degree (1 major) China Business and Economics (2021)
Bachelor's degree (1 major) Business Information Systems (2021)
Bachelor's degree (1 major) Economathematics (2021)
Bachelor's degree (1 major) Business Management and Economics (2021)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021)
Bachelor's degree (1 major) Economathematics (2022)
exchange program Business Management and Economics (2022)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Business Information Systems (2023)
Bachelor's degree (1 major) Economathematics (2023)
Bachelor's degree (1 major) Business Management and Economics (2023)
Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation	
Public Policy					12-WiPo-G-212-mo1	
Module	e coord	inator		Module offered by		
holder	of the (	Chair of Labour Econor	nics	Faculty of Managen	nent and Economics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts		<b>I</b>			
econor V V V V V The lec 1. Intro 2. Theo 3. Emp 4. Publ 5. Cost Intendo	<ul> <li>This course provides an introduction into public policy. Public policy studies the role of the government in the economy. It basically answers four questions: <ul> <li>When should the government intervene?</li> <li>How might the government intervene?</li> <li>What is the effect of those interventions?</li> <li>Why do governments choose to intervene in the way that they do?</li> </ul> </li> <li>The lecture will cover the following topics: <ul> <li>Introduction into public economics/finance</li> <li>Theoretical toolkit</li> <li>Empirical toolkit</li> <li>Cost Benefit Analysis</li> </ul> </li> </ul>					
The ain	n of the	o course is to provide s	tudents with and under	standing of the publ	lic policy making pro	cess of the
govern will lea nance. de ansv	ment a rn the o The foo wers to	nd to endow them with core theoretical models cus will not lie on the t public policy questior	the necessary skills to s of public economics a heoretical details, but r	judge about and/or is well as modern en ather on the beauty	r design public polici ppirical methods of p of the different meth	es. Students oublic fi- ods to provi-
Course	<b>S</b> (type, r	number of weekly contact hour	rs, language — if other than Ge	rman)		
V (2) + Module	T (2) e taugh	t in: German and/or Er	nglish			
Metho module is	<b>d of ass</b> s creditab	<b>Sessment</b> (type, scope, lang Ile for bonus)	guage — if other than German,	examination offered — if no	ot every semester, informati	ion on whether
a) writt	en exa	mination (approx. 6o n	ninutes) or			
b) port	folio (a	pprox. 20 pages)				
Langua	ige of a	ssessment: German ar	nd/or English			
Allocat	ion of p	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teaching cycle						
Teaching cycle: winter semester						
Referre	ed to in	LPO I (examination regulat	ons for teaching-degree progra	immes)		
Module	Module appears in					
Master	's degr	ee (1 major) China Bus	iness and Economics (2	2021)		
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. re instliche Intelligenz und Data	g. data record Ba- a Science - 2024	page 112 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Business Information Systems (2021) Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major, 1 minor) Business Management and Economics (Minor, 2021) Bachelor's degree (1 major) Economathematics (2022) exchange program Business Management and Economics (2022) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title				Abbreviation		
Microeconomics 2					12-Mik2-G-212-m01	
Module coordinator			Module offered by			
holder	of the (	Chair of Industrial Econ	omics	Faculty of Managen	nent and Economics	
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ester	undergraduate				
Conter	nts					
Outline	e of syll	abus:				
1. Cost	minimi	isation	с .:			
2. Prof	it maxir rt-run m	nisation and the supply	y function			
3. 51101	z-riin m	arket equilibrium				
5. Gove	ernmen	t interventions				
6. Mon	opoly					
7. Prici	ng strat	tegies with market pow	er			
8. Intro	Dauction tegic in	n to game theory	1			
Intend	ed lear	ning outcomes	·			
Tho air	n of the	courso is to understar	d how markets work	Vo will invostigato th	a babaviar of a com	nany in dif
ferent the so- of view	market called ( is desi	structures; namely per oligopoly markets. Ultir irable. Using our model	fectly competitive mark nately, we are interest s, we will also try to an	ets, monopoly mark ed in whether the ma alyze the consequer	ets and all forms in Irket results from a s Inces of different gove	between, ocial point ernment in-
tervent	tions. I	he knowledge that stud	lents gain in this cours	e will be in their futu	re course of studies	of benefits
nomic	actors i	make their decisions. S	itudents will thus learn	the important buildi	ng blocks of econon	nic thought.
This kr	nowledg	ge will also be useful in	the workplace and eve	en in their private live	es.	
Course	<b>es</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (2) +	T (2)					
Metho module is	<b>d of ass</b> s creditab	<b>sessment</b> (type, scope, lang le for bonus)	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
written	exami	nation (approx. 60 min	utes)			
Langua	age of a	ssessment: German an	id/or English			
Allocat	tion of <sub>l</sub>	olaces				
Additio	onal inf	ormation				
WORKIC						
150 h		_	_			
Teaching cycle						
Teaching cycle: winter semester						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Modul	Module appears in					
Bachel	s degr lor's de	ee (1 major) China Busi gree (1 major) Business	ness and Economics (2 Information Systems	(2021) (2021)		
Bachelor's Data Scien	with 1 ma Ice (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- Science - 2024	page 114 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Economathematics (2021) Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Economathematics (2022) exchange program Business Management and Economics (2022) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Business Information Systems (2023) Bachelor's degree (1 major) Economathematics (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)





# Linguistics (ECTS credits)

Module title				Abbreviation		
Level One Module German Linguistics 04-DtLABA-BM-SW-241-r					241-m01	
Module	e coord	inator		Module offered by		
holder	ofthe	Chair of German Lingui	stics	Institute of German	Studies	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade		· · · · ·		
Duratio	<u>n</u>	Module level	Other prerequisites			
1 5000	stor	undergraduate				
Conton						
Contents         Within the lecture, this module aims to provide an overview and first introduction to the important parts of German linguistics. At the same time, the seminar that is a part of the module, provides students with analytical and description methods up to the word level, for example morphological segmentation and classification of individual word forms into basic morphemes, morphology and inflectional morphemes, morphological and semantic analysis of word formation structures, phonetic and phonological transcription in International Phonetic Alphabet (IPA)-phonetics, graphical realisation of phonemes and associated with orthography principles. The associated tutorial helps to practise further and to become more confident with the analytical and description methods, acquired in the seminar.         Intended learning outcomes         Students possess an overview of the discipline German linguistics and its individual subdisciplines. They are able to describe and analyse linguistic units up to the word level assuredly. Thanks to the module, students are familiar with the basic analytical and description techniques of linguistics, which will be extended and consolidated in the following modules.         Courses (type, number of weekly contact hours, language – if other than German)         V (2) + S (2)         Method of assessment (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)						
written	exami	nation (approx. 75 min	utes)			
Allocat	tion of	places				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cycl	e				
Referre	ed to in	LPO I (examination regulation	ions for teaching-degree progra	ammes)		
§ 43   N § 63   N	Nr. 2 b) Nr. 2 b)					
Module appears in						
Module	e studie	es (Bachelor) Orientier	ungsstudien (2020)			
Module studies (Bachelor) German Language and Literature (2023)						
First st	First state examination for the teaching degree Grundschule German (2024)					
First state examination for the teaching degree Gymnasium German (2024)						
First St	First state examination for the teaching degree Realschule German (2024)					
Bachel	are erg orie de	gree (2 maiors) Germa	n l anguage and literati	re (2024)		
Bachel	or's de	gree (1 maior. 1 minor)	German Language and	Literature $(2024)$		
Bachelor's Data Scien	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. re	g. data record Ba- a Science - 2024	page 117 / 154

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major, 1 minor) German Language and Literature (Minor, 2024) Bachelor's degree (1 major, 1 minor) Digital Humanities (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) First state examination for the teaching degree Grundschule German (2025) First state examination for the teaching degree Realschule German (2025) First state examination for the teaching degree Gymnasium German (2025) First state examination for the teaching degree Mittelschule German (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (Minor, 2025) Bachelor's degree (1 major, 2 minor) German Language and Literature (Minor, 2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (2 majors) German Language and Literature (2025)

Module title				Abbreviation		
Level Two Module Grammatical Structures of German 04-DtLABA-AM-SW1-241-r					l-241-m01	
Module	e coordinator			Module offered by		
holder	of the Chair of German Lin	guist	ics	Institute of German	Studies	
ECTS	Method of grading	5	Only after succ. con	pl. of module(s)		
5	numerical grade			•		
Duratio	on Module level		Other prerequisites			
1 seme	ster undergraduate					
Conten	its		1			
Within gramm cy depo tion of tise the start w sis of d and stu	Within the lecture, this module aims to provide an overview of the German syntax with focus on the valency grammatical sentence analysis, e.g. determining clauses by the use of grammatical samples, determining valency depending and non-depending clauses, syntactical function and semantics of relative clauses, formal description of the structure of complex sentences. During this module, which is a part of the seminar, students will practise the analytical and description methods, covered during the lecture, by authentic sentences. This module will start with the analysis of simple sentences, then goes over to levels of clauses and will continue with the analysis of difficult sentences up to sub-levels. The tutorial, which is a part of the module, provides further practise and students will be confident with the covered description and analytical methods.					
Intend	ed learning outcomes					
Studen tify and up to tl	its possess solid knowleds d determine syntactic struc he sentence level assured	ge of t tures y.	the sub-area syntax w and are acquainted v	ith focus on valency with the description	grammar, they are a and analysis of lingu	able to iden- iistic units
Course	<b>S</b> (type, number of weekly contact	10urs,	language — if other than Ger	man)		
V (1) +	S (2)					
Metho module is	<b>d of assessment</b> (type, scope, s creditable for bonus)	langua	age — if other than German, o	examination offered — if no	ot every semester, informati	on on whether
written	examination (approx. 75 r	ninut	es)			
Allocat	tion of places					
Additio	onal information					
Worklo	ad					
150 h						
Teachi	ng cvcle					
Referre	ed to in LPO I (examination reg	ulation	s for teaching-degree progra	mmes)		
§ 43   N § 63   N	Nr. 2 b) Nr. 2 b)					
Module	e appears in					
First st	ate examination for the tea	ching	g degree Grundschule	e German (2024)		
First state examination for the teaching degree Gymnasium German (2024)						
First state examination for the teaching degree Realschule German (2024)						
First st	First state examination for the teaching degree Mittelschule German (2024)					
Bachelor's degree (2 majors) German Language and Literature (2024)						
Bachelor's degree (1 major, 1 minor) German Language and Literature (2024)						
Bachel	or's degree (1 major, 1 min		erman Language and	Enterature (Minor, 20	)24)	
First st	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)					
Bachelor's	with 1 major Artificial Intelligence and		JMU Würzburg • gener	rated 18-Jun-2025 • exam. res	g. data record Ba-	page 119 / 154
Data Scien	ce (2024)		chelor (180 ECTS) Kü	instliche Intelligenz und Data	Science - 2024	

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

First state examination for the teaching degree Realschule German (2025) First state examination for the teaching degree Gymnasium German (2025) First state examination for the teaching degree Mittelschule German (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (2025) Bachelor's degree (1 major, 1 minor) German Language and Literature (Minor, 2025) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (2 majors) German Language and Literature (2025)





# **Biology** (ECTS credits)

Module title				Abbreviation	
Evoluti	on and	the Animal Kingdom			07-1A1TI-152-m01
Module coordinator				Module offered by	
holder of the Professorship of Zoology at the Department of Faculty of Biology Electronmicroscopy					
ECTS	Meth	od of grading	Only after succ. com	npl. of module(s)	
5	nume	rical grade			
Duratio	on	Module level	Other prerequisites		
1 semester		undergraduate	Admission prerequisite to assessment: exercises. Regular attendance (minimum 80%) and successful completion of exercises (approx. 25 to 30 hours) are prerequisites for admission to assessment.		
Conton	te				

#### Contents

The lecture *Evolution* will acquaint students with fundamental concepts and mechanisms of evolutionary biology: the origins of diversity; natural and sexual selection; speciation; population genetics. It will provide students with an introduction to phylogenetic reconstruction and will thus enable them to develop an understanding of the system of plants and animals. During the exercise, students will complete exercises on mechanistic evolution and evolutionary history. The lecture *Tierreich (Animal Kingdom)* will discuss the diversity of animal organisms on the basis of the phyla of the animal kingdom focusing on phylogenetic criteria. It will address the ecological constraints that led to the development of different types of body plans with their different structures and functions. In this context, the lecture will also develop an awareness in students of how important a knowledge of the fundamental principles of zoology is for research and applications not only but in particular in biology and medicine. In the exercise, students will prepare and/or examine selected species and histological preparations and will thus become familiar with the functional and morphological characteristics of the major multicellular animal phyla. In this context, students will practise working with light microscopes and stereo microscopes and will acquire fundamental preparation skills. They will prepare drawings, documenting and interpreting what they have seen.

#### Intended learning outcomes

Students will be familiar with the fundamental concepts and mechanisms of evolutionary biology and will know that these are key to understanding biological processes. They will have gained an overview of the diversity of animals on the basis of different types of body plans and will understand important structures in both a functional and an ecological context.

**Courses** (type, number of weekly contact hours, language – if other than German)

#### V (2) + Ü (3)

**Method of assessment** (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)

written examination (approx. 60 minutes) creditable for bonus

#### Allocation of places

--

## Additional information

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Workload

150 h

**Teaching cycle** 

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Referred to in LPO I (examination regulations for teaching-degree programmes)

§ 41 | Nr. 1 (4 ECTS credits) and § 41 | Nr. 4 (1 ECTS credits)

 $61 \mid$  Nr. 1 (4 ECTS credits) and  $61 \mid$  Nr. 4 (1 ECTS credits)

Bachelor's with 1 major Artificial Intelligence and	JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-	page 122 / 154
Data Science (2024)	chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024	



## Module appears in

Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Biology (2021)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Computer Science (2025)

Module title				Abbreviation		
Geneti	Genetics, Neurobiology, Behaviour 07-2A2GENV-152-m01					
Module	e coord	inator		Module offered by		
Dean o	of Studio	es Biologie (Biology)		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
5	nume	rical grade				
Duratio	on	Module level	Other prerequisites			
1 seme	ster	undergraduate	Admission prerequi (minimum 80%) and 30 hours) are prerec	site to assessment: d successful comple quisites for admissio	exercises. Regular at tion of exercises (ap n to assessment.	ttendance prox. 25 to
Conten	Its					
Fundar	mental	principles of genetics, I	neurobiology and beha	vioural biology.		
Intend	ed lear	ning outcomes				
Studen volved heritan	nts will in anim Ice.	understand that there a nal behaviour and will b	re molecular, cellular a be able to relate anima	and system biologica l behaviour to the mo	al mechanisms and polecular and formal l	processes in- bases of in-
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ge	rman)		
V (3)						
Metho	d of ass	<b>Sessment</b> (type, scope, lang	uage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
module is	s creditab	le for bonus)				
written credita	exami ble for	nation (approx. 60 to 9 bonus	o minutes)			
Allocat	ion of p	olaces				
Additio	onal inf	ormation				
Worklo	ad					
150 h						
Teachi	ng cvcl	e				
	<u> </u>					
Referre	ed to in	<b>LPO I</b> (examination regulation	ons for teaching-degree progra	ummes)		
§ 61   N	lr. 2 (2	ECTS credits)				
§ 61   N   § 61   N	lr. 3 (1 l Ir 4 (1 l	CTS credits)				
Modula	a annea	ors in				
Bachel	or's de	gree (1 major) Biology (	2015)			
Bachel	or's de	gree (1 major) Diology (	r Science (2015)			
Bachel	or's de	gree (1 major) Mathema	atics (2015)			
Bachelor's degree (1 major) Computational Mathematics (2015)						
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)						
Bachel	Bachelor's degree (1 major) Biology (2017)					
Bachel	Bachelor's degree (1 major) Computer Science (2017)					
	Bachelor's degree (1 major) Computer Science (2019) Modulo studios (Bachelor) Biology (2010)					
Module	e studie	es (Bachelor) Orientier	ngsstudien (2020)			
Bachel	or's de	gree (1 major) Biology (	2021)			
Pachalar <sup>a</sup> -	with a me	ior Artificial Intolligence and		rated 49 lup access a super-	r data record Da	
Data Scien	ce (2024)	or Artificial filelligence and	chelor (180 ECTS) Ki	instliche Intelligenz und Data	Science - 2024	page 124 / 154



Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020) Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025)

Module title				Abbreviation		
Mathematical Biology and Biostatistics				07-M-BST-152-m01		
Module coordinator Module offered				Module offered by		
holder	of the (	Chair of Bioinformatics		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
4	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	te	undergraduate	l			
Eundon	nontal	nrinciples of the most i	mortant mathematica	l and statistical mot	hads in hialagy	
Intende					nous in biology.	
Intende	ed lear					<u> </u>
Studen and nu	nts will mbers	have acquired fundame as well as the mathem	ental skills in the evaluatical description of bio	ation of experiments ological processes.	, the interpretation of	of readings
Course	<b>S</b> (type, r	number of weekly contact hour	s, language — if other than Ger	man)		
V (2) +	Ü (2)					
<b>Method</b> module is	<b>d of ass</b> s creditab	s <b>essment</b> (type, scope, lang le for bonus)	guage — if other than German, o	examination offered — if no	t every semester, informati	on on whether
written credita	exami ble for	nation (approx. 60 min bonus	utes)			
Allocat	ion of <b>j</b>	olaces				
Additio	nal inf	ormation				
Additio	inat init					
Worklo	ad					
120 h						
Teachi		2				
Teacini	ig tyti	e				
Referre	a to in	<b>LPO I</b> (examination regulation	ons for teaching-degree progra	mmes)		
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Biochem	istry (2015)			
Bachel	or's de	gree (1 major) Biology ( gree (1 major) Compute	2015) 2015)			
Bachol	or's de	gree (1 major) Compute	(2015)			
Bachel	or's de	gree (1 major) Mathem	atics (2015) ational Mathematics (a	215)		
Bachel	or's de	gree (1 major) Compute	Riology (Minor 2015)	515)		
Bachel	or's de	gree (1 major, 1 minor)	2017)			
Bachel	or's de	gree (1 major) Biochem	istry (2017)			
Bachelor's degree (1 major) Diochennistry (2017) Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's degree (1 major) Biology (2021)						
Bachel	Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)					
Bachel	Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)					
Bachel	or's de	gree (1 major) Compute	er Science and Sustaina	ability (2021)		
Bachel	or's de	gree (1 major) Biochem	istry (2022)	-		
Bachel	or's de	gree (1 major) Biology (	2022)			
Bachelor's Data Sciene	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gener chelor (180 ECTS) Kü	rated 18-Jun-2025 • exam. reg instliche Intelligenz und Data	g. data record Ba- I Science - 2024	page 126 / 154

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module title					Abbreviation	
Plant and Animal Ecology					07-3A30EK0-152-m	01
Module coordinator			Module offered by	_		
Dean of	f Studi	es Biologie (Biology)		Faculty of Biology		
ECTS	Metho	od of grading	Only after succ. con	npl. of module(s)		
6	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
This mo and bio as on th fundam re the f	odule v otic env he stru nental r undam	vill provide students with vironments. The module v cture and dynamics of po model concepts of ecolog ental knowledge necess	an overview of the ir will focus on the funct pulations, communit gy, will become famili ary to develop an unc	iteractions of plants tional adaptation to ties and ecosystems ar with examples of lerstanding of currer	and animals with th environmental cond . Students will be int research findings an it ecological problen	eir abiotic itions as well roduced to id will acqui- ns.
Intende	ed lear	ning outcomes				
Studen portant their er ronmer	ts are f abioti wironn ntal iss	amiliar with the fundame c and biotic factors that i nent. In addition, they un ues.	ental principles of res nfluence the distribu derstand the scientif	earch in the field of tion and frequency of tion in the frequency of the field of t	ecology and with the f occurrence of orga has to the assessme	e most im- nisms in ent of envi-
Course	<b>S</b> (type, r	number of weekly contact hours,	anguage — if other than Ger	man)		
V (2) +	Ü (2)					
Methoo module is	<b>d of ass</b> creditab	<b>Sessment</b> (type, scope, langua le for bonus)	ge — if other than German, o	examination offered — if no	t every semester, informati	on on whether
written credita	exami ble for	nation (approx. 90 minut bonus	es)			
Allocat	ion of <sub>l</sub>	olaces				
Additio	nal inf	ormation				
Worklo	ad					
190 h	au					
Taashir						
Teachin	ig cyci	e				
Referre	d to in	<b>LPO I</b> (examination regulation	s for teaching-degree progra	mmes)		
§61 N	r. 4					
Module	e appea	ars in				
Bachel	or's de	gree (1 major) Biology (20	015)			
Bachel	or's de	gree (1 major) Geography	(2015)			
Bachelor's degree (1 major) Computer Science (2015)						
Bachel	oris de	gree (1 major) Mathemat	nos (2015) Anal Mathematics (a.	245)		
Bachel	or's de	gree (1 major) Computati gree (1 major -1 minor) Ri	ology (Minor 2015)	712)		
First sta	ate exa	mination for the teaching	degree Gymnasium	Biology (2015)		
Bachel	or's de	gree (1 major) Biology (20	) 17)	5101059 (2013)		
Bachel	Bachelor's degree (1 major) Computer Science (2017)					
Bachel	Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019)					
Bachelor's Data Scienc	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gener	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 128 / 154

## UNIVERSITÄT WÜRZBURG

Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

Bachelor's degree (1 major) Biology (2021) Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020) Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Biology (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) exchange program Biosciences (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

Module	e title		Abbreviation			
Genes,	Molec	ules, Technologies	07-3A3GEMT-152-m01			
Module coordinator Module offered by						
Dean of Studies Biologie (Biology)				Faculty of Biology		
ECTS	Method of grading Only after su		Only after succ. con	npl. of module(s)		
6	nume	numerical grade				
Duration Module level		Module level	Other prerequisites			
1 semester undergraduate		undergraduate				
Conten	Contents					

The module Gene, Moleküle, Technologien (Genes, Molecules, Technologies) will include lectures on the following topics: The section Spezielle Genetik (Special Genetics) will build on Einführung in die Genetik (Introduction to Genetics) and will deepen the students' knowledge of topics from the following areas: structure and evolution of the eukaryotic genome, regulatory RNA, epigenetically and evolutionarily significant genetic mechanisms. The section will also focus on methods of gene expression profiling, reverse genetics and modern methods of gene function and gene sequence analysis. In the lecture Einführung in die Bioinformatik (Introduction to Bioinformatics), students will acquire an overview of major areas in the field of bioinformatics: protein sequence and protein domain analysis, phylogeny and evolution of sequences, protein structure, RNA/DNA sequences and structures, cellular networks (regulation, metabolism) and systems biology. During the section Einführung in die Biotechnologie (Introduction to Biotechnology), students will acquire an overview of the following topics: history of biotechnology, DNA and RNA technologies, recombinant antibodies, molecular diagnostics, nanobiotechnology, biomaterials, bioprocess engineering, microbial biotechnology, transgenic animals and plants, microfluidics. The lecture Einführung in die Pharmakokinetik (Introduction to Pharmacokinetics) will provide students with an overview of the rational development of drugs and active agents. The module component will discuss an important aspect for biologists in more detail: the optimisation of the pharmacokinetics of small molecules and proteins. Pharmacokinetics describes the uptake, distribution, metabolism and elimination of a drug or xenobiotic in an organism.

#### Intended learning outcomes

Students possess an advanced knowledge on genome evolution and the regulation of gene expression and are familiar with current methods in genetics as well as methods for the analysis of DNA and protein databases. They have acquired an overview of both traditional and modern methods in biotechnology and are familiar with fundamental topics in biotechnology. Students have acquired an overview of the fundamental principles of the development and review of active agents in research, clinical practice and the pharmaceutical industry. They are familiar with methods and technologies in biology and are able to evaluate potential applications of these in research and industry.

**Courses** (type, number of weekly contact hours, language – if other than German)

#### V (4)

**Method of assessment** (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes) creditable for bonus

#### **Allocation of places**

--

Additional information

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Workload

180 h

Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

#### Module appears in

Bachelor's degree (1 major) Biology (2015)
Bachelor's degree (1 major) Computer Science (2015)
Bachelor's degree (1 major) Mathematics (2015)
Bachelor's degree (1 major) Computational Mathematics (2015)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2015)
Bachelor's degree (1 major) Biology (2017)
Bachelor's degree (1 major) Computer Science (2017)
Bachelor's degree (1 major) Computer Science (2019)
Bachelor's degree (1 major) Biology (2021)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2020)
Bachelor's degree (1 major, 1 minor) Biology (Minor, 2021)
Bachelor's degree (1 major) Biology (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)
exchange program Biosciences (2022)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)
Bachelor's degree (1 major) Mathematics (2023)
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)
Bachelor's degree (1 major) Computer Science (2025)





## Law (ECTS credits)

Faculty of Law						
Contents						

German contents available but not translated yet.

Die Vorlesung führt über die Beantwortung allgemeiner juristischer Fragen wie der Normenhierarchie, der Gesetzessystematik und Auslegungstechniken in die großen Rechtsgebiete der Rechtswissenschaft ein. Dabei werden insbesondere die fünf Bücher des Bürgerlichen Gesetzbuches sowie das Handels-, Gesellschafts- und das Arbeitsrecht besprochen. Gegenstand der Einheit Öffentliches Recht sind die Grundrechte, das Staatsorganisationsrecht, das Verwaltungsrecht in seinen allgemeinen und besonderen Ausprägungen sowie das Europa- und das Völkerrecht. Im Strafrecht wird inhaltlich vor allem auf den allgemeinen Teil und die wichtigsten Normen des Besonderen Teils des Strafgesetzbuches eingegangen.

#### Intended learning outcomes

German intended learning outcomes available but not translated yet.

Die Studierenden verfügen über Basiswissen in den wichtigsten Teilbereichen der Rechtswissenschaft. Sie haben neben fachlichen Grundkenntnissen über das materielle und das Prozessrecht auch allgemeine Kenntnisse beispielsweise über die Gesetzessystematik und die Rechtsquellenlehre erworben. Anhand von Beispielfällen haben sie ersten Einblick ins juristische Arbeiten erhalten.

Courses (type, number of weekly contact hours, language - if other than German)

V (4)

**Method of assessment** (type, scope, language – if other than German, examination offered – if not every semester, information on whether module is creditable for bonus)

written examination (approx. 120 minutes)

#### **Allocation of places**

max. 80 places. Students applying after not having successfully completed assessment in the past two semesters will be given preferential consideration. The remaining places will be allocated by lot. A waiting list will be maintained and places re-allocated by lot as they become available. Places on all courses of the module with a restricted number of places will be allocated in the same procedure.

#### **Additional information**

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#### Workload

150 h

**Teaching cycle** 

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Referred to in LPO I (examination regulations for teaching-degree programmes)

#### Module appears in

Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019)

Bachelor's degree (1 major) Political and Social Studies (2020)

Bachelor's with 1 major Artificial Intelligence and	JMU Würzburg • generated 18-Jun-2025 • exam. reg. data record Ba-	page 133 / 154
Data Science (2024)	chelor (180 ECTS) Künstliche Intelligenz und Data Science - 2024	

Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)

Module title					Abbreviation
Commercial and Business Law for Economics and Managem				ient	02-G&Hre-G-212-m01
Module coordinator				Module offered by	
Dean of the Faculty of Law				Faculty of Law	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)	
5	nume	rical grade			
Duratio	n	Module level	Other prerequisites		
1 seme	ster	undergraduate			
Conten	ts				
Germar	n conte	nts available but not tran	slated yet.		
Dieses	Modul	bietet eine Einführung in	das deutsche und eu	uropäische Gesellscl	hafts- und Handelsrecht.
Intende	ed learn	ning outcomes			
Germar	n intend	ded learning outcomes av	vailable but not trans	lated yet.	
Der/Die schafts gen des	e Studie formen s Recht	erende verfügt über Kenn ı, Vertretungsmacht, Haft s der Handelsgeschäfte ı	tnisse des Gesellsch ung, Gründung und A und der Handelsgesel	afts- und Handelsred Juflösungen von Ges Ilschaften.	chts, insbesondere über Gesell- sellschaften sowie über Grundla-
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)	
V (3) +	Ü (2)				
Methoo module is	<b>d of ass</b> creditab	e <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether
written	examir	nation (approx. 120 minu	tes)		
Assess	ment o	ffered: Usually once a yea	ar, summer semester		
Allocat	ion of p	Diaces			
		<b>4</b> *			
Additio	nal Info	ormation			
 Warkla					
workto	au				
Teachir		<b>a</b>			
Teacini	ig tyti	5			
Module appears in					
Bachelor's degree (1 major) Business Management and Economics (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) exchange program Business Management and Economics (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Business Management and Economics (2023) Bachelor's degree (1 major) Business Management and Economics (2024) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025)					





# **Geography** (ECTS credits)

Module title					Abbreviation	
Introduction to Geographical Remote Sensing 04-Geo-FERNE-152-mo1						m01
Module coordinator				Module offered by	Module offered by	
holder	of the l	Professorship of Remote	e Sensing	Institute of Geogram	ohy and Geology	
ECTS	Meth	od of grading	Only after succ. con	npl. of module(s)	,	
	nume	rical grade				
Duratio	n	Module level	Other prorequisites			
Duratio	-					
1 seme	ster	undergraduate				
Conten	ts					
sensing - surfact ant tem and act mote se	ture giv g / phy ces, obj nperatu tive sys ensing	sical principles (energy jects under investigatio ire, emissivity / detecto stems, e.g. hyperspectra parameters (land, atmo	and radiation, interac n: soils, vegetation, w rs: characterisation of al and LiDAR) / radar re osphere, oceans).	tions radiation - atmo ater) / thermal remot remote sensing data emote sensing / rada	etical basics, histor osphere, interactions a sensing: radiation a, platforms and sens ir interferometry / ba	s radiation laws, radi- sors (passive sics for re-
Intende	ed lear	ning outcomes				
The stu sphere mote se	dents to the ensing	describe basics of earth object under investigat data, sensors and platf	n observation. They ou ion and back to the se Forms.	tline and explain the nsor. They emphasis	radiation path throu e essential characte	igh the atmo- ristics of re-
Course	<b>S</b> (type, r	number of weekly contact hours	s, language — if other than Ge	rman)		
V (2) + Module	T (2) e taugh	t in: German and/or En	glish			
Method	d of ac	Second (type score lang	uago if other than Corman	ovamination offered if no	t ovory competer informati	on on whothor
module is	creditab	ele for bonus)			it every semester, mormati	on on whether
written	exami	nation (approx. 45 minu	ites)			
Langua	ige of a	ssessment: German an	d/or English			
credita	ble for	bonus				
Allocat	ion of p	places				
Additio	nal inf	ormation				
			_			
Worklo	ad					
150 h						
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 66   Nr. 2						
Module appears in						
Bachelor's degree (1 major) Geography (2015)						
Bachelor's degree (1 major) Computer Science (2015)						
Bachelor's degree (1 major) Mathematics (2015)						
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2015)						
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (2015)						
Bachelor's degree (1 major, 1 minor) Pre- and Protohistoric Archaeology (Minor, 2015)						
Bachelor's degree (1 major, 1 minor) Geography (Focus Physical Geography) (2015)						
Bachol	or's de	gree (1 major, 1 mmor) ( gree (2 majors) Dre- and	Protohistoric Archaoc	ian Geography) (2019)	5/	
Bachelor's	with 1 ma	jor Artificial Intelligence and	JMU Würzburg • gene	rated 18-Jun-2025 • exam. reg	g. data record Ba-	page 137 / 154
Data Scient	ce (2024)		chelor (180 ECTS) K	ünstliche Intelligenz und Data	Science - 2024	



First state examination for the teaching degree Gymnasium Geography (2015) Bachelor's degree (2 majors) Geography (2015) Bachelor's degree (1 major, 1 minor) Geography (2017) Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Module studies (Bachelor) Geography (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) First state examination for the teaching degree Gymnasium Geography (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (Minor, 2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

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Module title					Abbreviation	
Applications of Remote Sensing in Geography       04-Geo-FERNA-152-m01					m01	
Module coordinator			Module offered by			
holder	of the l	Professorship of Remo	e Sensing	Institute of Geograp	ohy and Geology	
ECTS	Meth	od of grading	Only after succ. cor	npl. of module(s)		
5	nume	rical grade		1 (7		
Duratio	n n	Module level	Other prerequisites			
1 6000	stor	undergraduate		•		
Conton						
The lec fundan graphic topics atmosp cation	ture im nental i cal data are ana oheric o and ch	parts basic knowledge understanding of remo a, metadata, spatial ov llogue, visual image in correction. A focus lies ange detection. Furthe	about the analysis of tely sensed data as geo erlaying of geodata, ge terpretation, digital ima on the digital remote s rmore, basics in model	remote sensing data binformation and late ographical informatio age processing (calib ensing based mappi ling of remote sensir	for geographical que er geoinformation in on systems) is given oration, transformation ng, i.e. spectral anal og parameters is con	estions. First, general (geo- . Following on, filter) and ysis, classifi- veyed.
Intend	ed lear	ning outcomes				
The stu reflect sess di	idents their es fferent	explain applications of ssential characteristics methodological appro	earth observation and . They summarise fund aches for the evaluatio	remote sensing. The amental aspects of ( n of remote sensing	y explain geographi digital) image proces data for geographica	cal data and ssing and as- al questions.
Course	<b>S</b> (type, r	number of weekly contact hou	s, language — if other than Ge	rman)		
V (2) + Module	T (2) e taugh	t in: German and/or Er	glish			
Metho	d of ass	sessment (type, scope, lan	guage — if other than German,	examination offered — if no	t every semester, informat	ion on whether
module is creditable for bonus)						
written	exami	nation (approx. 45 min	utes)			
Language of assessment: German and/or English						
Allocat	ion of					
Allocal		Jiaces				
Additio	onal Inf	ormation				
Workload						
150 h	-					
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor's degree (1 major) Geography (2015)						
Bachelor's degree (1 major) Computer Science (2015)						
Bachelor's degree (1 major) Mathematics (2015)						
Bachelor's degree (1 major, 1 minor) Geography (Minor, 2015) Bachelor's degree (1 major, 1 minor) Geography (Focus Physical Geography) (2015)						
Bachelor's degree (1 major, 1 minor) Geography (Focus Human Geography) (2015)						
Bachelor's degree (2 majors) Geography (2015)						
Bachel	or's de	gree (1 major, 1 minor)	Geography (2017)			
Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's Data Scien	with 1 ma ce (2024)	jor Artificial Intelligence and	JMU Würzburg • gene chelor (180 ECTS) Ki	rated 18-Jun-2025 • exam. reg ünstliche Intelligenz und Data	g. data record Ba- 1 Science - 2024	page 139 / 154

Bachelor's degree (1 major) Computer Science (2019) Module studies (Bachelor) Geography (2020) Bachelor's degree (1 major) Computer Science and Sustainability (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Mathematics (2023) Bachelor's degree (1 major) Geography (2023) Bachelor's degree (2 majors) Geography (2023) Bachelor's degree (1 major, 1 minor) Geography (Minor, 2023) Bachelor's degree (1 major, 1 minor) Geography (2023) Bachelor's degree (1 major, 2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024) Bachelor's degree (1 major) Computer Science (2025) Bachelor's degree (1 major) Computer Science and Sustainability (2025)

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# Medicine

(ECTS credits)

Module title					Abbreviation	
Practical Course in medical terminology					03-M-MT-152-m01	
Module coordinator				Module offered by		
Institute for the History of Medicine				Faculty of Medicine		
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	(not) s	successfully completed				
Duration Module level		Other prerequisites				
1 seme	ster	unknown				
Conten	ts		<u>.</u>			
No info	rmatio	n on contents available.				
Intende	ed lear	ning outcomes				
No info	rmatio	n on intended learning ou	utcomes available.			
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)		
P (o)		,				
Metho module is	<b>d of ass</b> s creditab	<b>sessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
written	exami	nation (approx. 60 to 90	minutes)			
Allocation of places						
Additio	onal inf	ormation				
Worklo	ad					
150 h	_					
Teachi	ng cycl	e				
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor's degree (1 major) Computer Science (2015) Bachelor's degree (1 major) Computer Science (2017) Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)						
Bachelor's degree (1 major) Computer Science (2025)						



Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

## Key Skills Area (20 ECTS credits)

Bachelor's with 1 major Artificial Intelligence and Data Science (2024)



# **General Key Skills**

(5 ECTS credits)

In addition to the modules listed below, students may also take modules offered by JMU as part of the pool of general transferable skills (ASQ).


## General Key Skills (subject-specific)

(ECTS credits)

Module title					Abbreviation		
Tutor activity 1					10-I-TUT1-152-m01		
Module coordinator				Module offered by			
Dean of Studies Informatik (Computer S			Science)	Institute of Compute	er Science		
ECTS Method of grading Only after succ. cor			Only after succ. com	pl. of module(s)			
2	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites				
1-2 sem	ester	undergraduate					
Content	ts						
Tutoring	g activi	ties in the area of compu	ter science.				
Intende	d learr	ning outcomes					
Imparti	ng kno	wledge and skills to stud	ents of computer sci	ence.			
Courses	<b>5</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
T (2)							
Method	l of ass	<b>essment</b> (type, scope, langua	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
module is	creditab	le for bonus)					
Wrap-u	p repor	t on tutoring activities (5	to 10 pages)				
Allocati	ion of p	olaces					
Additional information							
 Worklo	ad						
60 h							
Teachin	ig cvcl	2					
	0.7	-					
Referre	d to in	<b>LPO I</b> (examination regulations	s for teaching-degree progra	mmes)			
§ 22    N	§ 22    Nr. 2 f)						
§ 22    N	§ 22 II Nr. 3 f)						
Module appears in							
Bachelo	or's deg	gree (1 major) Computer S	Science (2015)				
First sta	ite exa	mination for the teaching	degree Realschule C	Computer Science (20	015)		
First state examination for the teaching degree Gymnasium Computer Science (2015)							
Bachelor's degree (1 major) Computer Science (2017)							
Bachelor's degree (1 major) Computer Science and Sustainability (2021)							
Bachelor's degree (1 major) computer science and Sustainability (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)							
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachelor's degree (1 major) Computer Science (2025)							
First state examination for the teaching degree Realschule Computer Science (2025)							
First sta	First state examination for the teaching degree Gymnasium Computer Science (2025)						
Bachelo	Bachelor's degree (1 major) Computer Science and Sustainability (2025)						
Bachelo	Bachelor's degree (1 major) Computer Science and Sustainability (2025)						

Tutor activity 2 10-I-TUT2-152-m01   Module coordinator Module offered by   Dean of Studies Informatik (Computer Science) Institute of Computer Science   ECTS Method of grading						
Module coordinator Module offered by   Dean of Studies Informatik (Computer Science) Institute of Computer Science   FCTS Method of grading						
Dean of Studies Informatik (Computer Science)   Institute of Computer Science     FCTS   Method of grading     Only after succ. compl. of module(s)						
ECTS Method of grading Only after succ. compl. of module(s)						
Lets method of grading only after succ. compt. of module(5)						
2 (not) successfully completed						
Duration Module level Other prerequisites						
1-2 semester undergraduate						
Contents						
Tutoring activities in the area of computer science.						
Intended learning outcomes						
Imparting knowledge and skills to students of computer science.						
<b>Courses</b> (type, number of weekly contact hours, language — if other than German)						
T (2)						
<b>Method of assessment</b> (type, scope, language – if other than German, examination offered – if not every semester, information on wh	ther					
module is creditable for bonus)						
All section of places						
Allocation of places						
Additional information						
Workload						
60 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
§ 22    Nr. 2 f)						
§ 22 II Nr. 3 f)						
Module appears in						
Bachelor's degree (1 major) Computer Science (2015)						
First state examination for the teaching degree Realschule Computer Science (2015)						
First state examination for the teaching degree Gymnasium Computer Science (2015)						
Bachelor's degree (1 major) Computer Science (2017)						
Bachelor's degree (1 major) Computer Science (2019) Bachelor's degree (1 major) Computer Science and Sustainability (2021)						
Dachelor's degree (1 major) computer science and Data Science (2021) Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachelor's degree (1 major) Computer Science (2025)						
First state examination for the teaching degree Realschule Computer Science (2025)						
First state examination for the teaching degree Gymnasium Computer Science (2025)						
Bachelor's degree (1 major) Computer Science and Sustainability (2025)						

Module title					Abbreviation		
Tutor activity 3					10-I-TUT3-152-m01		
Module coordinator				Module offered by			
Dean of Studies Informatik (Computer Science			Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	g Only after succ. compl. of module(s)				
2	(not) s	successfully completed					
Duratio	n	Module level	Other prerequisites	Other prerequisites			
1-2 sem	nester	undergraduate					
Conten	ts						
Tutoring	g activi	ties in the area of compu	iter science.				
Intende	ed learı	ning outcomes					
Imparti	ng kno	wledge and skills to stud	ents of computer sci	ence.			
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)			
T (2)							
Methoo module is	<b>l of ass</b> creditab	e <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
Wrap-u	p repoi	t on tutoring activities (5	to 10 pages)				
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
60 h							
Teachir	ıg cycl	e					
Referre	d to in	LPOI (examination regulations	s for teaching-degree progra	mmes)			
Module appears in							
Bachelor's degree (1 major) Computer Science (2015)							
Bachelor's degree (1 major) Computer Science (2017)							
Bachelor's degree (1 major) Computer Science (2019)							
Bachelo	Bachelor's degree (1 major) Computer Science and Sustainability (2021)						
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)							
Bachelor's degree (1 major) Computer Science (2025)							
Bachelor's degree (1 major) Computer Science and Sustainability (2025)							



## Module Catalogue for the Subject Artificial Intelligence and Data Science Bachelor's with 1 major, 180 ECTS credits

## Subject-specific Key Skills

(15 ECTS credits)

Module title				Abbreviation		
Seminar - Selected Topics in Artificial Intelligence and Data Science					10-I-SEM-KIDS-222-m01	
Module coordinator				Module offered by		
Dean o	fStudie	es Informatik (Computer	Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. com	pl. of module(s)		
5	nume	rical grade				
Duratio	n	Module level	Other prerequisites			
1 seme	ster	undergraduate		-		
Conten	ts					
Intende	ed learr	ning outcomes				
Course	<b>S</b> (type, n	umber of weekly contact hours, l	anguage — if other than Ger	man)		
S (2)						
Method module is	<b>d of ass</b> creditab	s <b>essment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether	
term pa Langua	term paper (10 to 15 pages) and presentation (30 to 45 minutes) with subsequent discussion Language of assessment: German and/or English					
Allocation of places						
Additio	nal info	ormation				
Workload						
150 h						
Teaching cycle						
<b>Referred to in LPO I</b> (examination regulations for teaching-degree programmes)						
Module appears in						
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)					
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)					
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)						

Module title					Abbreviation		
Artificia	Artificial Intelligence and Data Science Project Workshop   10-I-KIDS-PW-232-m01						
Module coordinator				Module offered by			
Dean o	f Studie	es Informatik (Computer	Science)	Institute of Comput	er Science		
ECTS	Metho	od of grading	Only after succ. com	npl. of module(s)			
5	numerical grade						
Duratio	on	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Workin	g on a	project assignment (in gr	oups).				
Intende	ed learı	ning outcomes					
The pro	ject en	ables the participants to	work on a computer	science problem in a	a team.		
Course	<b>S</b> (type, n	number of weekly contact hours, l	anguage — if other than Ger	rman)			
R (3) Module	e taugh	t in: German or English					
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)							
present Langua credita	presentation of project results (30 to 45 minutes) Language of assessment: German and/or English creditable for bonus						
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Workload							
150 h							
Teaching cycle							
Referred to in LPO I (examination regulations for teaching-degree programmes)							
Module appears in							
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)							

Module title					Abbreviation		
Project Presentation 10-I-PV-152-m01					10-I-PV-152-m01		
Module coordinator				Module offered by			
Dean of Studies Informatik (Computer S			Science)	Institute of Comput	er Science		
ECTS Method of grading			Only after succ. com	pl. of module(s)			
5	nume	rical grade					
Duratio	n	Module level	Other prerequisites				
1 seme	ster	undergraduate					
Conten	ts						
Present sentatio work-in	tation of on for l	of a project developed by aypersons with a knowle ess, is presented with the	the student (e.g. Bad dge of computer scie help of a poster, a sl	chelor's thesis, softw nce at a trade fair. Th hort talk and optiona	vare project) analogous to a pre- he project, which may also be ally a live demonstration.		
Intende	ed lear	ning outcomes					
The stu	dents a	are able to present a proj	ect they developed a	nd to create the requ	uired media.		
Course	<b>S</b> (type, r	number of weekly contact hours, l	anguage — if other than Ger	man)			
S (5)							
Methoo module is	<b>d of ass</b> creditab	<b>eessment</b> (type, scope, langua le for bonus)	ge — if other than German, e	examination offered — if no	t every semester, information on whether		
present ge of co Langua	tation o ompute ge of a	of a project developed by er science at a trade fair a ssessment: German and/	the candidate analog s well as discussion ( ′or English	gous to a presentatio (approx. 10 to 15 mir	on for laypersons with a knowled- nutes total)		
Allocat	ion of p	olaces					
Additio	nal inf	ormation					
Worklo	ad						
150 h							
Teachir	ıg cycl	e					
Referre	d to in	LPO I (examination regulations	s for teaching-degree progra	mmes)			
\$ 22    Nr 3 h)							
Module	annea	urs in					
Bachel	or's de	gree (1 major) Computer 9	Science (2015)				
First sta	Dacheror's degree (1 major) computer science (2015) First state examination for the teaching degree Gymnasium Computer Science (2015)						
Master's teaching degree Gymnasium MINT Teacher Education PLUS Flite Network Bavaria (ENR) (2016)							
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2016)							
Bachelor's degree (1 major) Computer Science (2017)							
Bachelor's degree (1 major) Computer Science (2019)							
Master'	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)						
Supple	Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2020)						
Bachelo	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)							
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)							
Master'	Master's teaching degree Gymnasium MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)						
Supplementary course MINT Teacher Education PLUS, Elite Network Bavaria (ENB) (2025)							





## **Thesis** (10 ECTS credits)

Module title Abbreviation						
Bachelor-Thesis Artificial Intelligence and Data Science   10-I-KIDS-BA-222-m01					10-I-KIDS-BA-222-m01	
Module coordinator				Module offered by		
Dean of Studies Informatik (Computer Science)			Science)	Institute of Comput	er Science	
ECTS	Metho	od of grading	Only after succ. con	ıpl. of module(s)		
10	nume	rical grade				
Duration Module level Other prerequisite			Other prerequisites			
1 seme	ster	undergraduate				
Conten	ts					
Resear scientif	ching a fic prac	nd writing on a defined p tice.	problem within a give	n time frame and ad	hering to the principles of good	
Intende	ed lear	ning outcomes				
The stu practice	idents a e.	are able to research and	write on a defined pro	oblem, adhering to t	he principles of good scientific	
Course	<b>S</b> (type, r	number of weekly contact hours, I	language — if other than Ger	rman)		
No cou	rses as	signed to module				
<b>Method of assessment</b> (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)						
Bachel Langua	or's the ige of a	esis (approx. 50 to 100 pa ssessment: German and	ages) /or English			
Allocat	ion of p	olaces				
Additio	nal inf	ormation				
Time to	compl	ete: 10 weeks.				
Worklo	ad					
300 h						
Teaching cycle						
Referred to in LPO I (examination regulations for teaching-degree programmes)						
Module appears in						
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2022)						
Bachel	Bachelor's degree (1 major) Artificial Intelligence and Data Science (2023)					
Bachelor's degree (1 major) Artificial Intelligence and Data Science (2024)						