



Annex SFB

Studienfachbeschreibung (subject description, SFB) for the subject Mathematical Data Science as a Bachelor's with 1 major with the degree "Bachelor of Science" (180 ECTS credits)

Responsible: Faculty of Mathematics and Computer Science Responsible: Institute of Mathematics Examination regulations version: 2022 Examination regulations version: 2022

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 for the modules in this SFB:	Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not cre- ditable for bonus.
Information on assessment procedures:	Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the me- thod 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 a 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)):

29-Mar-2022 (2022-4)

22-Nov-2023 (2023-103)

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.

Every module will be described using the following form:

Abbreviation	Module title								
	ECTS		Duration	(in semesters)	Method of grading		Module level		
	Courses		To be sp	o be specified in the form X (y) with course type X abbreviated as specified above and number of weekly contact hours y					
	Method of as	ssessm	ient						
	Only after su completion c	ccessf of	ul if applic	able					
	Other prerequisites		if applic	if applicable					
	Participants and allocati- on of places		locati- if applic	if applicable					
	Additional information		ion if applic	if applicable					
	Referred to in	n LPO I	if applic	able (examination re	gulations for teachin	g-degree programmes)			

Compulsory Course	Compulsory Courses (98 ECTS credits)									
Subfield Mathemat	Subfield Mathematics (73 ECTS credits)									
10-M-ANA-Ü-222-	Overview Analy	ysis								
m01	ECTS 13	Duration	n	2 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (4) ·	+ V (4) + Ü (2)		8				
	Method of asso	essment	oral e Asses Langu	oral examination of one candidate each (20 to 40 minutes) Assessment will have reference to the contents of modules 10-M-ANA1 and 10-M-ANA2. Language of assessment: German and/or English						
10-M-LNA-Ü-222-	Overview Linea	ar Algebra	a							
m01	ECTS 13	Duration	n	2 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (4) ·	+ V (4) + Ü (2)						
	Method of asse	essment	oral e Asses Langu	xamination of one sment will have re lage of assessmen	candidate each (20 to 40 minutes) ference to the contents of modules 10-M-LNA1 and 1 t: German and/or English	o-M-LNA2.				
10-M-ST01-222-	Stochastics 1	í					_			
m01	ECTS 10	Duration	<u>n</u>	1 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (4) ·	V (4) + U (2)						
	Method of asse	essment	a) wri b) ora c) ora Langu credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus						
10-M-NUM1-222-	Numerical Mathematics 1									
m01	ECTS 10	Duration	n	1 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (4) ·	V (4) + Ü (2)						
	Method of asso	essment	a) wri b) ora c) ora Langu credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus						
10-M-MFD-222-	Mathematical	Foundatio	ons of	Data Science						
m01	ECTS 10	Duration	n	2 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (2) ·	+ Ü (1) + V (2) + Ü (1)					
	Method of asso	essment	a) wri b) ora c) ora Langu credit	tten examination (Il examination of o I examination in g Jage of assessmen Jable for bonus	approx. 90 to 180 minutes, usually chosen) or ne candidate each (15 to 30 minutes) or roups (groups of 2, 10 to 15 minutes per candidate) t: German and/or English					

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 3 / 17

10-M-SEM-152-	Seminar Math	Seminar Mathematics										
m01	ECTS 5	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		S (2)									
	Method of ass	sessment	talk (60 to 120 minutes)								
			Langu	lage of assessmer	it: German and/or English							
	Referred to in	LPO I	§ 22 II Nr. 3 f)									
10-M-APSL-222-	Applied Stochastics Lab											
m01	ECTS 6	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (2)	+ P (2)								
	Method of ass	sessment	proje	ct work (30 to 60 h	ours)							
			credit	able for bonus	it: German and/or English							
10-M-MLNL-222-	Machine Lear	ning and N	lumeri	cs Lab								
m01	ECTS 6	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (2)	+ P (2)	- -	·						
	Method of ass	sessment	project work (30 to 60 hours)									
				Language of assessment: German and/or English								
			crean	able for bonus								
Subfield Computer	Science (25 EC	IS credits	5)									
10-I-AKIDS1-222-	Algorithms, Al and Data Science 1											
1101	ECTS 10	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) + U (2)									
	Method of ass	sessment	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, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 10 minutes) or an oral examination in groups of 2 candidates (approx, 1									
			date)	date).								
			creditable for bonus									
10-I-AKIDS2-222-	Algorithms, A	I and Data	Scien	ce 2								
m01	ECTS 10	Duratio	n	1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) ·	+ Ü (2)								
	Method of ass	sessment	writte	n examination (ap	prox. 60 to 120 minutes).							
			lf ann	ounced by the lec	turer at the beginning of the course, the written	examination may be	replaced by an oral examination					
			date)		approx. 20 minutes) of an oral examination in g	roups of 2 candidates	approx. 12 minutes per callul-					
			creditable for bonus									

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 4 / 17

10-I-DSML-222-	Data Science & Machine Learning										
mo1	ECTS 5 Duration		า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Course	S	,	V (2) -	$\sqrt{(2) + \ddot{U}(2)}$						
	Method	d of asse	essment	writte	n examination (appr	rox. 60 to 120 minute	s).				
				lf ann	ounced by the lectu	rer at the beginning o	of the course, the written exami	nation may be	replaced by an oral examination		
				ofone	e candidate each (ap	prox. 20 minutes) or	an oral examination in groups	of 2 candidates	s (approx. 15 minutes per candi-		
				date).	able for bonus						
Compulson, Flortin	as Lines			credit S gradi							
Compulsory Electiv	es Linea	ar Algeb	ra (5 ECT	S crear	(5)						
10-M-LNA1-222-	Linear	Algebra	1					·			
m01	ECTS	5	Duration	1	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		Ü (2)							
	Method	d of asse	essment	writte	n examination (appr	rox. 90 to 180 minute	es) and written exercises (appro	x. 12 exercise s	heets with approx. 4 exercises		
				each)	and of accordment.	Cormon and lor Engl	ich				
	1:	Almahua									
10-M-LNA2-222-	Linear	Algebra	2								
1101	ECIS	5	Duration	1	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Courses										
	Method	d of asse	essment	written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises							
					Language of assessment: German and/or English						
	l Analı			Lungu		German and/or Engl					
	es Analy	ysis (5 E	CTS creat	its)							
10-M-ANA1-222-	Analys	IS 1						1			
11101	ECTS	5	Duration	1	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		U (2)							
	Method	d of asse	essment	written examination (approx. 90 to 180 minutes) and written exercises (approx. 12 exercise sheets with approx. 4 exercises							
				each)							
	Analyc			Langu	Language of assessment: German and/or English						
mo1	FCTC	15 2	Duration			Mathad of grading	(not) successfully completed	Madullaval	undergreduete		
	ECIS	5	Duration	1	1 Semester	Method of grading	(not) successfully completed	Modul level	undergraduate		
	Course	S		U (2)	• .• .			· · ·			
	Method	d of asse	essment	writte	n examination (appi	ox. 90 to 180 minute	s) and written exercises (appro	ox. 12 exercise s	sneets with approx. 4 exercises		
				Langu	age of assessment:	German and/or Fngl	ish				
10-M-LNA2-222- mo1 Compulsory Electiv 10-M-ANA1-222- mo1	Linear A ECTS Course Method es Analys ECTS Course Method ECTS Course Method	Algebra 5 s d of asse ysis (5 E is 1 5 s d of asse is 2 5 s d of asse d of asse	2 Duration essment Duration essment Duration	Ü (2) writte each) Langu its) Ü (2) writte each) Langu Ü (2) writte each) Langu	1 semester n examination (approximation (appro	Method of grading ox. 90 to 180 minute German and/or Engl Method of grading ox. 90 to 180 minute German and/or Engl Method of grading ox. 90 to 180 minute German and/or Engl	(not) successfully completed (not) successfully completed (not) successfully completed (not) successfully completed (not) successfully completed (not) successfully completed (not) successfully completed (s) and written exercises (appro-	Modul level	undergraduate sheets with approx. 4 exercises undergraduate sheets with approx. 4 exercises undergraduate sheets with approx. 4 exercises		

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 5 / 17

Compulsory Electives Mathematical Data Science (40 ECTS credits)											
Subfield Mathemat	ubfield Mathematics (20 ECTS credits)										
10-M-NUM2-222-	Numerical N	lathematics	2								
m01	ECTS 10 Duration		n 1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) + Ü (2)								
	Method of a	ssessment	a) written examination (b) oral examination of o c) oral examination in g Language of assessmen creditable for bonus) written examination (approx. 90 to 180 minutes, usually chosen) or) oral examination of one candidate each (15 to 30 minutes) or) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) anguage of assessment: German and/or English reditable for bonus							
10-M-ST02-222-	Stochastics	2									
m01	ECTS 10	Duratio	n 1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) + Ü (2)								
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus								
10-M-OML-222-	Optimizatio	n for Machi	ne Learning								
m01	ECTS 10	Duratio	n 1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) + Ü (2) Module taught in: German and/or English								
	Method of assessment		a) written examination (b) oral examination of o c) oral examination in g Language of assessmen Assessment offered: In creditable for bonus	approx. 90 to 180 minutes, usually chosen) or ne candidate each (15 to 30 minutes) or roups (groups of 2, 10 to 15 minutes per candidate) t: German and/or English the semester in which the course is offered and in t	he subsequent s	emester					
10-M-MML-222-	Mathematic	s of Machin	e Learning								
m01	ECTS 10	Duratio	n 1 semester	Method of grading numerical grade	Modul level	undergraduate					
	Courses		V (4) + Ü (2) Module taught in: German and/or English								
	Method of a	ssessment	a) written examination (b) oral examination of o c) oral examination in g Language of assessmen Assessment offered: In creditable for bonus	approx. 90 to 180 minutes, usually chosen) or ne candidate each (15 to 30 minutes) or roups (groups of 2, 10 to 15 minutes per candidate) t: German and/or English the semester in which the course is offered and in t	he subsequent s	emester					

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 6 / 17

10-M-MWR-222-	Modell	ing and	Computa	tional Science						
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Course	S		V (4) - Modu	V (4) + Ü (2) Module taught in: German and/or English					
	Methoo	d of asso	essment	a) wri b) ora c) ora Langu Asses credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 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 creditable for bonus					
10-M-VAN-222-	Advand	ed Ana	lysis							
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Course	S		V (4) -	+ Ü (2)					
	Method of assessment			a) wri b) ora c) ora Langu credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-ALG-222-	Introduction to Algebra									
m01	ECTS	ECTS 10 Duratio		n	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Course	S		V (4) -	V (4) + U (2)					
	Methoo	d of asso	essment	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus						
10-M-DGE-222-	Introdu	iction to	Differen	tial Ge	tial Geometry					
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate	
	Course	s	_	V (4) + Ü (2)						
	Methoo	d of asso	essment	a) wri b) ora c) ora Langu Asses credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 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 creditable for bonus					

10-M-DGL-222-	Ordina	ary Diffe	rential Eq	uation	S					
m01	ECTS	10	Duratio	n	1 semester	Method of grading r	numerical grade	Modul level	undergraduate	
	Cours	es		V (4) ·	+ Ü (2)	· · ·				
	Metho	d of ass	essment	a) wri b) ora c) ora Langu credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-FTH-222-m01	Introd	uction to	o Complex	c Analy	/sis					
	ECTS	10	Duratio	n	1 semester	Method of grading r	numerical grade	Modul level	undergraduate	
	Cours	es		V (4) ·	(4) + Ü (2)					
	Metho	d of ass	essment	a) wri b) ora c) ora Langu credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus					
10-M-PGE-222-	Introduction to Projective Geometry									
m01	ECTS 10 Duration		n	1 semester	Method of grading r	numerical grade	Modul level	undergraduate		
	Courses			V (4) ·	+ Ü (2)					
	Method of assessment			 a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 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 creditable for bonus 					emester	
10-M-GAN-222-	Geom	etric Ana	lysis							
m01	ECTS	10	Duratio	n	1 semester	Method of grading r	numerical grade	Modul level	undergraduate	
	Courses		V (4) ·	+ Ü (2)						
	Method of assessment		a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus							

10-M-DIM-222-	Introdu	ntroduction to Discrete Mathematics											
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	+ Ü (2)	· · · ·							
	Metho	d of ass	essment	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus									
10-M-FAN-222-	Introdu	uction to	Function	nal Ana	lysis								
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Course	S		V (4) -	(4) + Ü (2)								
	Method of assessment			a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus									
10-M-PAR-222-	Introdu	Juction to Partial Differential Equations											
m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses			V (4) -	V (4) + Ü (2)								
	Method of assessment			a) wri b) ora c) ora Langu Asses credit	a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 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 s creditable for bonus				emester				
10-M-ZTH-222-m01	Introdu	uction to	Number	Theory	/								
	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses		V (4) -	+ Ü (2)									
	Method of assessment			a) written examination (approx. 90 to 180 minutes, usually chosen) or b) oral examination of one candidate each (15 to 30 minutes) or c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus									

	Annlin	Annihad Alexahira									
10-M-AAL-222-M01	Applied	1 Algeb	ra								
	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	s		V (4) -	+ Ü (2)				_		
	Method	d of ass	essment	a) wri	tten examination (a	pprox. 90 to 180 min	utes, usually chosen) or				
				b) ora	l examination of on	e candidate each (15	to 30 minutes) or				
				c) ora	c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)						
				Langu	Language of assessment: German and/or English						
				credit	able for bonus						
10-M-TOP-222-	Introdu	iction to	o Topolog נ	у							
m01	ECTS	5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Course	S		V (2) ·	+ Ü (2)		-	3			
	Method	d of ass	essment	a) wri	tten examination (a	pprox. 90 to 180 min	utes, usually chosen) or				
				b) ora	l examination of on	e candidate each (15	to 30 minutes) or				
				c) ora	l examination in gro	oups (groups of 2, 10	to 15 minutes per candidate)				
				Langu	lage of assessment	: German and/or Engl	lish				
				Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
		creditable for bonus									
10-M-EFM-222-	Introduction to Stochastic Financial Mathematics										
m01	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level	undergraduate		
	Courses			V (4) -	V (4) + Ü (2)						
	Method	d of ass	essment	a) written examination (approx. 90 to 180 minutes, usually chosen) or							
				b) ora	b) oral examination of one candidate each (15 to 30 minutes) or						
				c) oral examination in groups (groups of 2, 10 to 15 minutes per candidate)							
				Language of assessment: German and/or English							
MILOCO											
10-M-LUGP-232-	Introdu	iction to) Mathem	atical	Logic						
	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level			
	Course	S		V (4) + Ü (2)							
				Modu	le taught in: Germa	n and/or English					
	Method	d of ass	essment	a) wri	tten examination (a	pprox. 90 to 180 min	utes, usually chosen) or				
				b) ora	l examination of on	e candidate each (15	to 30 minutes) or				
				c) ora	l examination in gro	oups (groups of 2, 10	to 15 minutes per candidate)				
				Langu	lage of assessment	: German and/or Engl	lish the course is offered and in th	a cubcaquant c	mastar		
				credit	able for bonus	ie semester in willen	the course is onered and in th	e subsequent se	emester		
				Asses	Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus						

Subfield Computer	Science								
10-I-ST-KIDS-222-	Software T	echnology fo	r Artificial Intelligence a	nd Data Science					
m01	ECTS 5	Duration	1 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (2) + Ü (2)						
	Method of	assessment	written examination (ap If announced by the lec of one candidate each date). creditable for bonus	oprox. 60 to 120 minutes). turer at the beginning of the course, the written (approx. 20 minutes) or an oral examination in g	examination may be roups of 2 candidate:	replaced by an oral examination s (approx. 15 minutes per candi-			
10-I-PPM-222-m01	Practical C	ourse in Prog	ramming for Mathemati	cal Data Science					
	ECTS 5	Duration	n 1 semester	Method of grading (not) successfully comp	leted Modul level				
	Courses		P (6)						
	Method of	assessment	practical examination (If announced by the lec of one candidate each date).	programming exercises, approx. 120 hours) and turer at the beginning of the course, the written (approx. 20 minutes) or an oral examination in g	written examination examination may be groups of 2 candidates	(approx. 60 to 120 minutes) replaced by an oral examination s (approx. 15 minutes per candi-			
	other prere	quisites	ntended learning outcomes of the following module are required: 10-I-GdP. It is therefore strongly recommended to complete his before.						
10-I-DB-152-m01	Databases								
	ECTS 5	Duratio	n 1 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (2) + Ü (2)						
	Method of assessment		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 exami of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per date). Language of assessment: German and/or English creditable for bonus						
	Referred to	in LPO I	§ 49 Nr. 1 b) § 69 Nr. 1 b)						
10-l-GdP-172-m01	Fundament	als of Progra	mming	mming					
	ECTS 5	Duration	n 1 semester	Method of grading numerical grade	Modul level	undergraduate			
	Courses		V (2) + Ü (2)						
	Method of	assessment	written examination (ap If announced by the lec of one candidate each date). creditable for bonus	vritten examination (approx. 60 to 120 minutes). f 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 candi- date). creditable for bonus					
	Referred to	in LPO I	§ 49 Nr. 1 b) § 69 Nr. 1 b)						

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 11 / 17

10-I-DL-222-m01	Deep Learning								
	ECTS 5	Duratior	l	1 semester	Method of grading numerical grade	Modul level	undergraduate		
	Courses		V (2) +	+ Ü (2)					
	Method of asso	essment	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 (approx. 15 minutes per candi-						
			credit	able for bonus					
	Referred to in L	PO I	§ 22	§ 22 Nr. 3 h)					
10-I-MCS-191-m01	Introduction in	ito Humar	n-Comp	outer Interaction					
	ECTS 5	Duratior	<u>י</u>	1 semester	Method of grading numerical grade	Modul level	undergraduate		
	Courses		V (3) +	- Ü (1)	· · ·	•			
	Method of asso	essment	writte	n examination (app	rox. 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 (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus						
10-I-CV-222-m01	Computer Vision								
	ECTS 5	Duration	า	1 semester	Method of grading numerical grade	Modul level	undergraduate		
	Courses		V (2) + Ü (2) Module taught in: German and/or English						
	Method of assessmen		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 examinatio of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per cand date). Language of assessment: German and/or English creditable for bonus						
	Referred to in L	PO I	§ 22	Nr. 3 b)					
10-I-NLP-222-m01	Natural Langua	age Proce	ssing						
	ECTS 5	Duration	ו ו	1 semester	Method of grading numerical grade	Modul level	undergraduate		
	Courses		V (2) - Modu	- Ü (2) le taught in: Germa	n and/or English				
	Method of assessment		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 (approx. 15 minutes per candi- date). Language of assessment: German and/or English creditable for bonus						
	Referred to in L	101	§ 22	Nr. 3 b)		10			

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 12 / 17

10-I-SNA-222-m01	Statistical Network Analysis										
	ECTS 5	Duratior	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses		V (2) - Modu	V (2) + Ü (2) Module taught in: German and/or English							
	Method of ass	essment	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 (approx. 15 minutes per candi- date). Language of assessment: German and/or English creditable for bonus								
	Referred to in I	PO I	§ 22	Nr. 3 b)							
10-I-Kog-	Cognitive Syst	ems									
Sys-222-m01	ECTS 5	Duratior	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses		V (2) -	+ Ü (2)							
	Method of ass	essment	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 (approx. 15 minutes per candi- date). Language of assessment: German and/or English creditable for bonus								
10-I-TML-222-m01	Theory of Mac	hine Learı	arning								
	ECTS 5	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses		V (2) + Ü (2) Module taught in: German and/or English								
	Method of ass	essment	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 (approx. 15 minutes per cand date). Language of assessment: German and/or English creditable for bonus					replaced by an oral examination 6 (approx. 15 minutes per candi-			
	Referred to in I	_PO I	§ 22 II Nr. 3 b)								
10-I-AG-	Selected Fund	amentals	of Arti	ficial Intelligence ar	nd Data Science 1						
KIDS1-222-m01	ECTS 5	Duration	1	1 semester	Method of grading	numerical grade	Modul level	undergraduate			
	Courses		V (2) -	+ Ü (2)							
	Method of ass	essment	writte If ann of one date). Langu credit	n examination (app ounced by the lectu e candidate each (ap age of assessment: able for bonus	rox. 60 to 120 minute rer at the beginning o oprox. 20 minutes) of German and/or Engl	es). of the course, the written exami r an oral examination in groups lish	ination may be r of 2 candidates	replaced by an oral examination 6 (approx. 15 minutes per candi-			

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 13 / 17

10-I-AG-	Selec	ted Fund	amentals	of Arti	of Artificial Intelligence and Data Science 2					
KIDS2-222-m01	ECTS	5	Duratio	1	1 semester	Method of grading n	umerical grade	Modul level	undergraduate	
	Cours	ses		V (2) +	+ Ü (2)					
	Method of assessment			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 (approx. 15 minutes per candi- date). Language of assessment: German and/or English creditable for bonus						
Subfield Applicatio	ns									
10-M-ADS1-222-	Appli	cations o	of Data Sci	ence ir	n other disciplines	1				
m01	ECTS	5	Duration	า	1 semester	Method of grading n	umerical grade	Modul level	undergraduate	
	Cours	ses		V (2) +	⊦Ü (2)					
	Meth	od of ass	essment	a) written examination (60 to 120 minutes) or b) term paper (15 to 30 pages) or c) oral examination of one candidate each (15 to 30 minutes) Language of assessment: German and/or English						
10-M-ADS2-222-	Applications of Data Science in other disciplines 2									
m01	ECTS 5 Duratio		1	1 semester	Method of grading n	umerical grade	Modul level	undergraduate		
	Courses			$V(2) + \ddot{U}(2)$						
	Method of assessment			 a) written examination (60 to 120 minutes) or b) term paper (15 to 30 pages) or c) oral examination of one candidate each (15 to 30 minutes) Language of assessment: German and/or English 						
Key Skills Area (20	ECTS	credits)								
General Key Skills In addition to the m	(5 ECT 10dule	S credits s listed b) elow, stud	dents n	nay also take modu	les offered by JMU as p	art of the pool of general tran	sferable skills	(ASQ).	
General Key Skills	(subje	ct-specif	ic)							
10-M-Tu-	Exerc	ise tutor	or proof-r	eading	; in Mathematics					
Ko-152-mo1	ECTS	5	Duration	1	1 semester	Method of grading (not) successfully completed	Modul level	undergraduate	
	Cours	ses		T (o)						
	Meth	od of ass	essment	Asses appro	Assessment of tutoring activities or correcting work by supervising lecturers or exercise supervisors (1 to 2 teaching units or approx. 5 pieces of correcting work)					
	Addit	ional Info	ormation	Pleas	e direct application	to teaching coordinato	r Mathematics, he/she will se	elect participan	ts.	
	Referred to in LPO I			§ 22	l Nr. 3 f)					

Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 14 / 17

10-M-VHB1-152-	E-Learning and	-Learning and Blended Learning Mathematics 1									
m01	ECTS 2	Duratio	n	1 semester	Method of grading (not) successfully completed Modul level undergraduate						
	Courses		Ü (2)								
			Cours	e type: eLearning, n	mostly Virtuelle Hochschule Bayern (vhb)						
	Method of ass	essment	project (web-based, 15 to 20 hours)								
	F 1		Asses	sment offered: Onc	ce a year, winter semester						
10-M-VHB2-152-	E-Learning and		Learn	earning mathematics 2							
	ECIS 2	Duration	n Lücco	1 semester	Method of grading (not) successfully completed Modul level undergraduate						
	Courses		U (2) Cours	U (2) Course type: eLearning, mostly Virtuelle Hochschule Bayern (vhb)							
	Method of asso	essment	projec	ct (web-based, 15 to	o 20 hours)						
		C	ASSES								
Subject-specific Ke	ey Skills (15 ECT	S credits)									
Subject-specific Ke	y Skills, Compu	lsory Cou	irses (1	11 ECTS credits)							
10-M-GBM-152-	Basic Notions	and Meth	ods of	Mathematical Reas	soning						
m01	ECTS 2	Duration	n	1 semester	Method of grading (not) successfully completed Modul level undergraduate						
	Courses		V (1) + Ü (1)								
	Method of assessment		project (10 to 15 pages) Language of assessment: German and/or English								
	Additional Information		Additional information on module duration: block taught prior to the beginning of the lecture period.								
	Referred to in L	PO I	§ 22 Nr. 1 h)								
			§ 22 Nr. 2 f)								
10-M-ASM-152-	Reasoning and	Writing	in Mati	nematics							
	ECIS 2	Duration	n	1 semester	Method of grading (not) successfully completed Modul level undergraduate						
	Courses	- ·	V (1) +	- U (1)							
	Method of ass	essment	projec Langu	project (10 to 20 pages) Language of assessment: German and/or English							
10-M-EPMDS-222-	External Intern	ship Mat	hematical Data Science								
m01	ECTS 7	Duratio	n	1 semester	Method of grading (not) successfully completed Modul level undergraduate						
	Courses	-	P (o)								
	Method of ass	essment	place	ment report (10 to 2	20 pages)						
			Language of assessment: German and/or English								

Subject-specific Ke	t-specific Key Skills, Compulsory Electives (4 ECTS credits)							
10-M-COM-152-	Computationa	l Mathem	atics					
m01	ECTS 4	Duratio	n 1 semester Method of grading (not) successfully completed Modul level undergraduate					
	Courses		$V(1) + \ddot{U}(2)$					
	Method of ass	essment	project in the form of programming exercises (approx. 20 to 25 hours)					
			Language of assessment: German and/or English					
	Poforrad to in I		Assessment offered: Unce a year, winter semester					
10-M-PPC-152-m01	Programming		s zz ii Ni. 3 i)					
10-10-10-152-1101	FIOGRAMMING	Duration	n 1 semester Method of grading (not) successfully completed Modul level undergraduate					
		Duration	P (2)					
	Mothod of acc	occmont	r (2)					
	method of ass	essment	Language of assessment: German and/or English					
			Assessment offered: Once a year, summer semester					
	Referred to in I	LPO I	§ 22 Nr. 3 f)					
10-M-SEM2-152-	Supplementar	y Semina	r Mathematics					
m01	ECTS 4 Duratio		n 1 semester Method of grading (not) successfully completed Modul level undergraduate					
	Courses		5 (2)					
	Method of ass	essment	talk (60 to 120 minutes)					
			Language of assessment: German and/or English					
10-M-GES-152-m01	Selected Topic	s in Histo	pry of Mathematics					
	ECTS 5	Duratio	n 1 semester Method of grading (not) successfully completed Modul level undergraduate					
	Courses		V (2) + U (2)					
	Method of ass	essment	a) talk (45 to 90 minutes) or					
			c) project work (15 to 25 hours)					
			Language of assessment: German and/or English					
			Assessment offered: In the semester in which the course is offered and in the subsequent semester					
	Referred to in I	LPO I	§ 22 Nr. 3 f)					
10-M-MSC-152-	Mathematical	Writing						
m01	ECTS 5	Duration	n 1 semester Method of grading (not) successfully completed Modul level undergraduate					
	Courses		V (2) + Ü (2)					
	Method of ass	essment	a) talk (45 to 90 minutes) or					
			D) term paper (10 to 15 pages) or					
			Language of assessment: German and/or English					
			Assessment offered: In the semester in which the course is offered and in the subsequent semester					
	Referred to in I	LPO I	§ 22 Nr. 3 f)					

	Bachelor's with 1 major Mathematical Data Science (2022)	JMU Würzburg • generated 19-Apr-2025 • exam. reg. data record 82 l22 - - H 2022	page 16 / 17
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10-M-SCH-152-m01	School Mathematics from a Higher Perspective										
	ECTS 5 Duratio		n	1 semester	Method of grading	(not) successfully completed	Modul level	undergraduate			
	Courses		V (2) -	V (2) + Ü (2)							
	Method of assessment			a) talk (approx. 45 minutes) or b) term paper (10 to 15 pages) or c) project work (15 to 25 hours) Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							
	Referred to in LPO I		§ 22 Nr. 1 h) § 22 Nr. 2 f) § 22 Nr. 3 f)								
Thesis (12 ECTS credits)											
10-M-BAD-222- m01	Thesis Mathematical Data Science										
	ECTS	12	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate		
	Courses			No courses assigned to module							
	Method of assessment			Bache	Bachelor's thesis (approx. 300 to 360 hours)						
	other prerequisites			The supervisor may make the successful completion of certain modules that are relevant for the respective topic a prerequisi- te for the assignment of the topic.							
	Additional Information			Time to complete: 12 weeks							