

Annex SFB

Studienfachbeschreibung (subject description, SFB) for the subject Mathematical Data Science as a Master's with 1 major with the degree "" (120 ECTS credits)

Responsible: Faculty of Mathematics and Computer Science

Responsible: Institute of Mathematics

Examination regulations version: 2025

Examination regulations version: 2025

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

= 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

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not cre-

modules in this SFB: ditable for bonus.

Information on Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the meassessment procedures: 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:

ASP02015

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

??-???-2025 (2025-??)

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	sessm	ent								
	Only after su completion o		ıl if applic	fapplicable							
	Other prereq	uisites	if applic	if applicable							
	Participants and allocation of places		ocati- if applic	if applicable							
	Additional information		ion if applic	if applicable							
	Referred to in	า LPO I	if applic	able (examination re	gulations for teachin	g-degree programmes)					

Compulsory Cours	05 (17 F/	TS cred	lite)									
10-M=AMM-	, -		<u> </u>	nco ai	nd Machine Learnin	σ						
L-252-m01	ECTS	10	Duration		1 semester	Method of grading numerical grade	Modul level					
	Course		1 - 3	V (4)	' (4) + Ü (2)							
					ıle taught in: Germa	an and/or English						
	Method of assessment			a) wr	a) written examination (approx. 90 to 120 minutes, usually chosen) or							
					oral examination of one candidate each (approx. 20 minutes) or oral examination in groups (groups of 2, 15 minutes per candidate)							
				Lang	uage of assessment	t: German or English						
				credi	table for bonus							
10-AI=ML-242-mo1			 		[Markhad of our Board or and all and a	[NA = - 1	Tama divista				
<u> </u>	ECTS	5	Duratio		1 semester + Ü (2)	Method of grading numerical grade	Modul level	graduate				
	Course	25			+ 0 (2) ule taught in: Germa	an and/or English						
				If anr of on date) Lang	nounced by the lect e candidate each (a	prox. 60 to 120 minutes) urer at the beginning of the course, the written e approx. 20 minutes) or an oral examination in gr t: German and/or English						
Compulsory Elective	ves (75 E	CTS cre	dits)									
Subfield Optimizat	tion (10	ECTS cre	edits)									
10-M=VOP-	Select	ed Topic	s in Optii	nizati	on							
T-161-m01	ECTS	10	Duratio	1	1 semester	Method of grading numerical grade	Modul level	graduate				
	Course	es			+ Ü (2) ıle taught in: Germa	an and/or English						
	Method of assessment			a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								

10-M=AOP-	Basics in Optimization											
T-161-m01	ECTS	10	Duration	n	1 semester	Method of grading numerical grade	Modul level	graduate				
	Course	S			V (4) + Ü (2) Module taught in: German and/or English							
	Method of assessment			b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
Subfield Applied N	Nathema	tics (20	ECTS cred	dits)								
10-M=VMM-	Advanc	ed Topi	ics in Mat	hemat	ics of Machine Lea	rning						
L-252-m01	ECTS	5	Duration		1 semester	Method of grading numerical grade	Modul level					
	Courses			V (3) - Modu	+ Ü (1) le taught in: Germa	n and/or English						
	Method	d of ass	essment	b) ora c) ora Langu Asses	a) written examination (approx. 60 to 90 minutes, usually chosen) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 2, 10 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=V-	Mathematical Continuum Mechanics											
KOM-161-m01	ECTS Course	5 S	Duration	n V (3) -	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses				Module taught in: German and/or English							
	Method of assessment			b) ora c) ora Langu Asses	ll examination of or l examination in gro lage of assessment	approx. 60 to 90 minutes, usually chosen) or ne candidate each (approx. 15 minutes) or oups (groups of 2, approx. 10 minutes per candida :: German or English he semester in which the course is offered and in t		emester				
10-M=AAAN-161-	Applied	Analys	sis									
mo1	ECTS	10	Duration		1 semester	Method of grading numerical grade	Modul level	graduate				
	Course				le taught in: Germa							
	Method of assessment			b) ora c) ora Langu Asses	ll examination of or l examination in gro lage of assessment	approx. 90 to 120 minutes, usually chosen) or ne candidate each (approx. 20 minutes) or oups (groups of 2, 15 minutes per candidate) :: German or English he semester in which the course is offered and in t	he subsequent so	emester				

10-M=ANG-	Numerio	c of Larg	ge Syster	ns of E	s of Equations							
G-161-mo1	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses	•			V (4) + Ü (2) Module taught in: German and/or English							
	Method	of asse	essment	b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=VN-	Numerio	c of Part	tial Differ	rential	Equations							
PE-161-mo1	ECTS	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses	;		V (4) + Modu	+ Ü (2) le taught in: Germaı	n and/or English						
	Method	of asse	essment	b) ora c) ora Langu Asses) written examination (approx. 90 to 120 minutes, usually chosen) or) oral examination of one candidate each (approx. 20 minutes) or) oral examination in groups (groups of 2, 15 minutes per candidate) anguage of assessment: German or English .ssessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus							
10-M=VOST-161-	Optimal Control											
mo1	ECTS 5 Duratio				1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses	5		V (3) + Ü (1) Module taught in: German and/or English								
	Method of assessment			b) ora c) ora Langu Asses	a) written examination (approx. 60 to 90 minutes, usually chosen) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=VI-	Inverse	Probler	ns 1									
PR-222-m01		5	Duration		1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses	i		V (3) + Ü (1) Module taught in: German and/or English								
	Method of assessment			b) ora c) ora Langu Asses	l examination of one l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, app German or English	prox. 10 minutes per ca		emester			

10-M=VIP2-222-	Inverse Problems 2												
mo1	ECTS 4	5	Duration	า	1 semester	Method of grading	numerical grade	Modul level	undergraduate				
	Courses				V (3) + Ü (1) Module taught in: German and/or English								
	Method	of asse	ssment	b) ora c) ora Langu Asses	n) written examination (approx. 60 to 90 minutes, usually chosen) or solver of the candidate each (approx. 15 minutes) or oral examination in groups (groups of 2, approx. 10 minutes per candidate) canguage of assessment: German or English descriptions of the semester in which the course is offered and in the subsequent semester are ditable for bonus								
10-M=AST-	Stochast	tical Pr	ocesses										
P-161-m01	ECTS 1	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (4) - Modu	- Ü (2) le taught in: Germaı	n and/or English							
	Method	of asse	ssment	b) ora c) ora Langu Asses	written examination (approx. 90 to 120 minutes, usually chosen) or								
10-M=AZ-	Time Series Analysis												
RA-212-m01	ECTS 10 Duratio				1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (4) + Ü (2) Module taught in: German and/or English									
	Method of assessment			b) ora c) ora Langu Asses	l examination of one l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, 15 r German or English	ates, usually chosen) or prox. 20 minutes) or minutes per candidate) the course is offered an		emester				
10-M=V-	Mathema	atical S	tatistics	i									
STA-212-m01	ECTS 1	10	Duration		1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (4) - Modu	+ Ü (2) le taught in: Germaı	n and/or English							
	Method of assessment			b) ora c) ora Langu Asses	l examination of one l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, 15 r German or English	utes, usually chosen) or prox. 20 minutes) or minutes per candidate) the course is offered an		emester				

10-M=ASM-	Stocha	Stochastic Models of Risk Management										
R-161-mo1	ECTS	10	Duratio	n	1 semester	Method of grading numerical grad	de	Modul level	graduate			
	Course	S			V (4) + Ü (2) Module taught in: German and/or English							
	Method	d of ass	essment	b) ora c) ora Lang Asse	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=V-	Selecte	ed Topic	s in Num	erical	and Applied Mathen	natics						
NAM-192-m01	ECTS	10	Duratio	n	1 semester	Method of grading numerical grad	de	Modul level	graduate			
	Course	S			+ Ü (2) ule taught in: Germa	n and/or English		•				
	Method of assessment			b) ora c) ora Lang Asse	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) canguage of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
Subfield Mathema	atics											
10-M=ADG-	Differential Geometry											
M-161-m01	ECTS	10	Duratio		1 semester	Method of grading numerical grad	de	Modul level	graduate			
	Course	S			V (4) + Ü (2) Module taught in: German and/or English							
	Method of assessment			b) ora c) ora Lang Asse	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=ALTH-161-	Lie The	ory										
mo1	ECTS	10	Duratio	n	1 semester	Method of grading numerical grad	de	Modul level	graduate			
	Courses				V (4) + Ü (2) Module taught in: German and/or English							
	Method of assessment			a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								

10-M=ARTH-242-	Mathematical Control Theory											
mo1	ECTS 1	10	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses				V (4) + Ü (2) Module taught in: German and/or English							
	Method	of asse	ssment	b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=AFT-	Complex		sis									
H-161-m01	ECTS 1	10	Duration		1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses			V (4) - Modu	+ Ü (2) le taught in: Germaı	n and/or English						
	Method	of asse	ssment	b) ora c) ora Langu Asses) written examination (approx. 90 to 120 minutes, usually chosen) or) oral examination of one candidate each (approx. 20 minutes) or) oral examination in groups (groups of 2, 15 minutes per candidate) anguage of assessment: German or English ssessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus							
10-M=AVS-	Insurance Mathematics 1											
M-161-m01	ECTS 10 Duratio				1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses			V (4) + Ü (2) Module taught in: German and/or English								
	Method	of asse	ssment	b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus							
10-M=AGP-	Giovanni	i Prodi	Lecture (Maste	r)			,				
Cin-152-m01	ECTS 5		Duration		1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses			V (3) - Modu	⊦ Ü (1) le taught in: English	l						
	Method	of asse	ssment	b) ora c) ora Langu Asses	l examination of on l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, app English	prox. 10 minutes per ca		emester			

10-M=VA-	Select	ed Topic	s in Anal	ysis									
NA-161-mo1	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Course	es.			V (4) + Ü (2) Module taught in: German and/or English								
	Metho	d of asse	essment	b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								
10-M=VFN-	Select	ed Topic	s in Finar	ncial M	athematics								
M-161-m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Course	es			- Ü (2) le taught in: Germar	n and/or English							
	Metho	d of asse	essment	b) ora c) ora Langu Asses) written examination (approx. 90 to 120 minutes, usually chosen) or) oral examination of one candidate each (approx. 20 minutes) or) oral examination in groups (groups of 2, 15 minutes per candidate) anguage of assessment: German or English assessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus								
10-M=VGDS-161-	Groups and their Representations												
mo1	ECTS 10 Duratio			n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Course	<u>!</u> S		V (4) + Ü (2) Module taught in: German and/or English									
	Method of assessment			b) ora c) ora Langu Asses	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								
10-M=VD-	Dynam	ical Sys	tems					,					
SY-161-mo1	ECTS	5	Duratio		1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (3) + Ü (1) Module taught in: German and/or English									
	Method of assessment			b) ora c) ora Langu Asses	l examination of one l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, app German or English	tes, usually chosen) or prox. 15 minutes) or prox. 10 minutes per can the course is offered and		emester				

10-M=VMB-	Mathema	atical I	maging										
V-161-m01	ECTS 5	5	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses				V (3) + Ü (1) Module taught in: German and/or English								
	Method o	of asse	ssment	b) ora c) ora Langu Asses	a) written examination (approx. 60 to 90 minutes, usually chosen) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus								
10-M=V-	Selected	l Topics	s in Math	ematio	al Control Theory								
TRT-242-mo1	ECTS 1	10	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (4) - Modu	+ Ü (2) le taught in: Germaı	n and/or English		,					
	Method	of asse	ssment	b) ora c) ora Langu Asses) written examination (approx. 90 to 120 minutes, usually chosen) or) oral examination of one candidate each (approx. 20 minutes) or oral examination in groups (groups of 2, 15 minutes per candidate) anguage of assessment: German or English ssessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus								
10-M=V-	Non-linear Analysis												
NAN-161-mo1	ECTS 5	5	Duratio		1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (3) + Ü (1) Module taught in: German and/or English									
	Method of assessment			a) written examination (approx. 60 to 90 minutes, usually chosen) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus									
10-M=VV-	Network	ed Sys	tems					,					
SY-161-m01	ECTS 5	5	Duratio		1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			V (3) + Ü (1) Module taught in: German and/or English									
	Method of assessment			b) ora c) ora Langu Asses	l examination of on l examination in gro lage of assessment:	e candidate each (ap ups (groups of 2, app German or English	prox. 10 minutes per ca		emester				

10-M=VPD-	Partial Diff	erential Equa	tions of Mathematical	Physics								
P-161-m01	ECTS 10	Duratio	1 semester	Method of grading numerical grade	Modul level	graduate						
	Courses		V (4) + Ü (2) Module taught in: Ge	/ (4) + Ü (2) Module taught in: German and/or English								
	Method of	assessment	b) oral examination o c) oral examination in Language of assessm									
10-M=V-	Pseudo Ric	emannian and	l Riemannian Geometr	у								
PRG-161-m01	ECTS 10	Duration	1 semester	Method of grading numerical grade	Modul level	graduate						
	Courses		V (4) + Ü (2) Module taught in: Ge	rman and/or English								
	Method of	assessment	a) written examination (approx. 90 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 15 minutes per candidate) c.anguage of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus									
10-M=AF-	Functional Analysis											
AN-161-m01	ECTS 10	Duratio	1 semester	Method of grading numerical grade	Modul level	graduate						
	Courses		V (4) + Ü (2) Module taught in: German and/or English									
	Method of	assessment	a) written examinatio b) oral examination o c) oral examination in Language of assessm Assessment offered: creditable for bonus	emester								
10-M=VAD-	Applied Di	fferential Geo	metry									
G-161-m01	ECTS 10	Duration		Method of grading numerical grade	Modul level	graduate						
	Courses		V (4) + Ü (2) Module taught in: Ge	rman and/or English								
	Method of	assessment	b) oral examination o c) oral examination in Language of assessm	n (approx. 90 to 120 minutes, usually chosen) or f one candidate each (approx. 20 minutes) or groups (groups of 2, 15 minutes per candidate) ent: German or English In the semester in which the course is offered an		emester						

10-M=VG-	Giovanni Prodi Lecture Selected Topics (Master)											
PSin-152-m01	ECTS 1	o Dı	uration	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			(4) + Ü (2) odule taught in: Englis	sh							
	Method o	of assessi	b) c) La) written examination (approx. 90 to 120 minutes, usually chosen) or) oral examination of one candidate each (approx. 20 minutes) or) oral examination in groups (groups of 2, 15 minutes per candidate) anguage of assessment: English assessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus								
10-M=AAM-	Selected	Topics in	n Mathen	natical Logic								
L-242-m01	ECTS 5	Dı	uration	1 semester	Method of grading	numerical grade	Modul level					
	Courses			(3) + Ü (1) Module taught in: German and/or English								
	Method o	of assessi	b) c) La	written examination (approx. 60 to 120 minutes, usually chosen) or or one candidate each (approx. 15 minutes) or or oral examination in groups (groups of 2, approx. 10 minutes per candidate) anguage of assessment: German and/or English assessment offered: In the semester in which the course is offered and in the subsequent semester reditable for bonus								
10-M=A-	Harmonic Analysis											
HAN-242-mo1	ECTS 1	o Di	uration	1 semester	Method of grading	numerical grade	Modul level					
	Courses			V (4) + Ü (2) Module taught in: German and/or English								
	Method o	of assessi	b) c) La	a) written examination (approx. 60 to 120 minutes, usually chosen) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, 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=V-	Cryptogra	aphy/Cod	ding The	ory			,					
KRY-192-m01	ECTS 1	o Dı	uration	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			(4) + Ü (2) odule taught in: Germ	an and/or English							
	Method of assessment			oral examination of o oral examination in gr anguage of assessmen	ne candidate each (ap oups (groups of 2, 15 i t: German or English	minutes per candidate)		emester				

10-M=V-	Discrete M	Mathematics						-					
DIM-161-m01	ECTS 5	Duratio	n 1	1 semester	Method of grading numerica	l grade	Modul level	graduate					
	Courses		V (3) +		an and/or English			•					
	Method of	⁻ assessment	b) oral c) oral Langua Assess	a) written examination (approx. 60 to 90 minutes, usually chosen) or b) oral examination of one candidate each (approx. 15 minutes) or c) oral examination in groups (groups of 2, approx. 10 minutes per candidate) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester creditable for bonus									
Subfield Researc	h in Groups a	nd Seminars	(10 ECTS	credits)									
10-M=GIN-		in Groups - In	verse Pro	oblems									
P-222-m01	ECTS 10	Duratio		1 semester	Method of grading numerica	l grade	Modul level	graduate					
	Courses		V (2) + : Module		an and/or English								
	Method of	assessment	Langua	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester									
10-M=G-	Research	Research in Groups - Mathematics of Machine Learning											
MAL-252-m01	ECTS 10	Duratio		1 semester	Method of grading numerica	l grade	Modul level						
	Courses			V (2) + S (2) Module taught in: German and/or English									
	Method of	assessment	Langua	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester									
10-M=S-	Seminar iı	n Mathematic	atics of Machine Learning										
MAL-252-m01	ECTS 5	Duratio	n 1	1 semester	Method of grading numerical grade		Modul level						
	Courses	,	S (2) Module taught in: German and/or English										
	Method of	assessment	talk (60 to 120 minutes) Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester										
10-M=SIN-	Seminar i	n Inverse Prol	olems										
P-252-m01	ECTS 5	ECTS 5 Duration		1 semester	Method of grading numerica	l grade	Modul level						
	Courses			S (2) Module taught in: German and/or English									
	Method of	assessment	talk (60 to 120 minutes) Language of assessment: German and/or English Assessment offered: In the semester in which the course is offered and in the subsequent semester										

10-M=GN-	Resear	ch in Gr	oups - Nu	merica	al Mathematics and	Applied Analysis			nerical Mathematics and Applied Analysis						
MA-161-m01	ECTS	10	Duration	n	1 semester	Method of grading	numerical grade	Modul level	graduate						
	Courses				V (2) + S (2) Module taught in: German and/or English										
	Method	d of asso	essment	Langu	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester										
10-M=SGP-	Giovan	ni Prodi	Seminar	(Mast	Master)										
Cin-152-m01	ECTS	5	Duratio	1	1 semester	Method of grading	numerical grade	Modul level	graduate						
	Course	S		S (2) Modu	le taught in: English										
	Method	d of asso	essment	Langu	oo to 120 minutes) lage of assessment: sment offered: In th		the course is offered and	d in the subsequent se	emester						
10-M=SN-	Semina	ar in Nu	merical M	athem	atics and Applied Ar	nalysis									
MA-161-m01	ECTS 5 Duratio			n	1 semester	Method of grading	numerical grade	Modul level	graduate						
	Courses			S (2) Module taught in: German and/or English											
	Method	d of asso	essment	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester											
10-M=SOP-	Seminar in Optimization														
T-161-mo1	ECTS	5	Duration	1	1 semester	Method of grading	numerical grade	Modul level	graduate						
	Courses			S (2) Module taught in: German and/or English											
	Method	d of ass	essment	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester											
10-M=SA-	Semina	ar Appli	ed Mathe	matics											
MA-192-m01			Duratio	1	1 semester	Method of grading	numerical grade	Modul level	graduate						
	Course	S		S (2) Module taught in: German and/or English											
	Method of assessment			talk (6 Langu	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: in the semester in which the course is offered and in the subsequent semester										

10-M=GD-	Rese	earch in G	iroups - Dy	namic	namical Systems and Control Theory							
SC-242-m01	ECTS	5 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses				V (2) + S (2) Module taught in: German and/or English							
	Meth	nod of as	sessment	Langi	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							
10-M=G-	Rese	earch in G	iroups - St	atistic	istics							
STA-161-m01	ECTS	10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Cour	ses			+ S (2) le taught in: Germar	n and/or English						
	Meth	nod of as	sessment	Langu	calk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							
10-M=GN-	Rese	earch in G	iroups - No	n-line	ı-linear Analysis							
LA-161-m01	ECTS	5 10	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses			V (2) + S (2) Module taught in: German and/or English								
	Meth	nod of as	sessment	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester								
10-M=SD-	Seminar in Dynamical Systems and Control Theory											
SC-242-m01	ECTS	5 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Courses			S (2) Module taught in: German and/or English								
	Meth	nod of as	sessment	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester								
10-M=S-	Sem	inar in St	atistics		•			'				
STA-161-m01	ECTS	5 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Cour	ses		S (2) Module taught in: German and/or English								
	Method of assessment			Langi	talk (60 to 120 minutes) Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester							

10-M=SN-	Seminar in Non-linear Analysis											
LA-161-m01	ECTS 5 Duration			1	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course	S		S (2)								
					le taught in: Germa	n and/or English						
	Method	d of ass	essment		60 to 120 minutes)	. Gorman or English						
				Language of assessment: German or English Assessment offered: In the semester in which the course is offered and in the subsequent semester								
Subfield Computer	Science	(15 EC	TS credits					<u>'</u>				
10-I=PNN-252-m01					•							
		5	Duration		1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course			V (2) ·	+ Ü (2)		-		1-			
	Method	d 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 candidate). Language of assessment: German and/or English creditable for bonus								
	Additio	nal Info	ormation	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): SE, IT, KI, HCI, GE, IN								
10-l=A-	Algorithms for Geographic Information Systems											
GIS-232-m01	ECTS	5	Duration		1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course		_	V (2) + Ü (2)								
	Method	d of ass	essment	If ann of one date). Langu	ounced by the lecture candidate each (a		of the course, the written exa ran oral examination in grou		replaced by an oral examination s (approx. 15 minutes per candi-			
	Additio	nal Info	ormation	Focus	es available for stu	dents of the Master's	programme Informatik (Com	nputer Science, 120	o ECTS credits): AT,KI,HCI,LR,IN			
10-l=AG-232-m01	Compu	tationa	l Geometr	y								
	ECTS	5	Duration	า	1 semester	Method of grading	numerical grade	Modul level	graduate			
	Course	S	,	V (2) -	+ Ü (2)							
	Method	d 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 candidate). Language of assessment: German and/or English creditable for bonus								
	Additio	nal Info			es available for stu I,GE,IN	dents of the Master's	programme Informatik (Com	nputer Science, 120	o ECTS credits):			

10-I=APA-161-m01	Approx	imatio	n Algorith	ms		-					
	ECTS	5	Duration	1	1 semester	Method of grading numerical grade	Modul level	graduate			
	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 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							
				AT,IT,		dents of the Master's programme Informatik (Con	nputer Science, 12	o ECTS credits):			
10-l=VG-161-m01	Visuali	zation	of Graphs								
	ECTS 5 Duratio			n	1 semester	Method of grading numerical grade	Modul level	graduate			
	Course	S		V (2)	/ (2) + Ü (2)						
	method of dosessment			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 candidate). Language of assessment: German and/or English creditable for bonus							
	Additional Information			Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT,IT,HCI,GE							
10-I=AKT-232-m01	Selected Topics in Theory										
	ECTS	5	Duratio		1 semester	Method of grading numerical grade	Modul level	graduate			
	Course	S		$V(2) + \ddot{U}(2)$							
	Method of assessment			a) written examination (approx. 60 to 120 minutes) or b) project work (report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) Language of assessment: German and/or English creditable for bonus							
	Additio	nal Info	ormation	Focus AT	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits):						

10-I=NLP-212-m01	Machine Learning for Natural Language Processing											
	ECTS 5	Duration	ı 1 semester	Method of grading numerical grade	Modul level	graduate						
	Courses		V (2) + Ü (2)		•							
	Method of	fassessment	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 candidate). Language of assessment: German and/or English creditable for bonus									
			Focuses available fo	r students of the Master's programme Informatik	(Computer Science, 120	o ECTS credits): AT,KI,HCI						
10-I=STM-162-m01												
	ECTS 5	Duration		Method of grading numerical grade	Modul level	graduate						
	Courses		V (2) + Ü (2)									
	Method of	fassessment	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 candidate).									
	Additiona	l Information	Language of assessment: German and/or English Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): AT, IT, HCI.									
10-I=SNA-232-m01	Statistical Network Analysis											
101 3111 2 32 11101	ECTS 5	Duration	<u> </u>	Method of grading numerical grade	Modul level	graduate						
	Courses		V (2) + Ü (2) Module taught in: English									
	Method of	fassessment	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 candidate). Language of assessment: English creditable for bonus									
	Additiona	l Information	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): IN									
10-Al=IAI-242-m01	Introducti	on in Al										
	ECTS 5	Duration	1 semester	Method of grading numerical grade	Modul level	graduate						
	Courses		V (2) + Ü (2) Module taught in: Ge	erman and/or English								
	Method of	fassessment	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 candidate). Language of assessment: German and/or English creditable for bonus									

10-AI=SEM1-242-	Seminar Artificial Intelligence										
mo1	ECTS 5	Duratio	n	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses		S (2) Modu	S (2) Module taught in: German and/or English							
	Method of as	sessment	Langu	Term paper (10 to 15 pages) and presentation (30 to 45 minutes) followed by a discussion on the topic Language of assessment: German and/or English creditable for bonus							
10-AI=CV1-242-	Computer Vis	sion 1									
mo1	ECTS 5	Duratio	n	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses			+ Ü (2) ıle taught in: Englis	sh						
			If ann of one date). Langu	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 candidate). Language of assessment: English creditable for bonus							
10-AI=CV2-242-	Computer Vision 2										
mo1	ECTS 5	Duratio		1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses		V (2) + Ü (2) Module taught in: English								
	Method of as	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. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: English creditable for bonus								
10-l=MLN1-232-	Machine Lea	rning for N	etwork	S 1							
mo1	ECTS 5	Duratio	n	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses		V (2) + Ü (2) Module taught in: English								
	Method of as		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 candidate). Language of assessment: English creditable for bonus								
	Additional In	formation	Focus	es available for st	udents of the Master's programme Informatik	(Computer Science, 12	o ECTS credits): AT,IT,SE,KI,HCI,IN				

10-l=MLN2-232-	Machine Learning for Networks 2											
mo1	ECTS 5 Duration			1	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses				V (2) + Ü (2)							
					ıle taught in: Englisl	h						
	Metho	d 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. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: English creditable for bonus								
	Additional Information			Focus	ses available for stu	dents of the Master's programme Informatik (Comp	outer Science, 12	o ECTS credits): AT,IT,SE,KI,HCI,IN				
10-l=IP-222-m01	Image	Proces	sing and C	ompu	tational Photograph	ту						
	ECTS	5	Duration	1	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses			V (2) + Ü (2) Module taught in: English								
	Method of assessment			If ann of one date) Langu	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 candidate). Language of assessment: English creditable for bonus							
10-I=RLCD-	Reinfo	Reinforcement Learning and Computational Decision Making										
M-252-m01	ECTS	5	Duration	1	1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses			V (2) + Ü (2) Module taught in: German 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 candidate). Language of assessment: German and/or English creditable for bonus								
	Addition	onal Inf	ormation	Focus	ses available for stu	dents of the Master's programme Informatik (Comp	outer Science, 12	o ECTS credits): IN				

10-l=M-	Multilingual NLP											
NLP-232-m01	ECTS 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses	•		V (2) + Ü (2) Module taught in: German and/or English								
	Method of ass	essment	If ann of one date). Langu	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 candidate). Language of assessment: German and/or English creditable for bonus								
10-AI=A-	Selected Topic	cs in Al M	ethods	1								
KAIM1-242-m01	ECTS 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses			+ Ü (2) le taught in: Germaı	n and/or English							
	Method of ass		b) pro c) ora d) ora Langu credit	a) written examination (approx. 60 to 90 minutes) or b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus								
10-AI=A-	Selected Topics in AI Methods 2											
KAIM2-242-m01	ECTS 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses		V (2) + Ü (2) Module taught in: German and/or English									
	Method of ass	essment	b) pro c) ora d) ora Langu	a) written examination (approx. 60 to 90 minutes) or b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic of oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus								
10-AI=SAC-242-	Self-aware Co	mputing										
mo1	ECTS 5	Duratio	n	1 semester	Method of grading	numerical grade	Modul level	graduate				
	Courses		V (2) + Ü (2) Module taught in: German and/or English									
	Method of ass	essment	If ann of one date). Langu	ounced by the lectu e candidate each (ap	emination (approx. 60 to 120 minutes) ed by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination didate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidates of assessment: German and/or English							

10-AI=AKA-	Selected Topics in AI Application & Technologies										
KI-242-m01	ECTS 5 Duration			1 semester	Method of grading numerical grade	Modul level	graduate				
	Courses				V (2) + Ü (2) Module taught in: German and/or English						
	Method	d of ass	essment	a) written examination (approx. 60 to 90 minutes) or b) project work: report (approx. 20 pages) with presentation (30 to 45 minutes) and subsequent discussion on the topic or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate). Language of assessment: German and/or English creditable for bonus							
10-l=MIR-252-m01	Music I	nforma	tion Retri	eval							
	ECTS	5	Duration	1	1 semester	Method of grading numerical grade	Modul level	graduate			
	Course	S		` '	+ Ü (2) le taught in: Germ	an and/or English					
	Method of assessment			a) written examination (approx. 60 to 120 minutes) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups of up to 3 candidates (approx. 15 minutes) Language of assessment: German and/or English creditable for bonus							
	Additio	nal Info	rmation	Focus	Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): GE						
10-l=PDS1-232-	Practical Course - Data Science 1										
mo1	ECTS 10 Duratio				1 semester	Method of grading numerical grade	Modul level	graduate			
	Course		_	R (6)							
	Method of assessment			report (10 to 15 pages) and presentation of results (15 to 30 minutes) Language of assessment: German and/or English creditable for bonus							
Thesis (30 ECTS cre	edits)										
10-	Master	-Thesis	Mathema	atical D	ata Science						
M=MAMDS-252-	ECTS	30	Duration	1	1 semester	Method of grading numerical grade	Modul level	graduate			
mo1	Course	S	•	No co	urses assigned to	module					
	Method of assessment			Master's thesis (750 to 900 hours total) Registration and assignment of topic in consultation with supervisor. Language of assessment: German or English							
	other prerequisites				upervisor may mak the assignment of	e the successful completion of certain mo the topic.	dules that are relevant for	the respective topic a prerequisi-			
	Additional Information			Time	to complete: 6 moi	nths					