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# Table 1 (Mathematics Bachelor)

	List of modules		ECT	'S Poi	nts	Field		Compulsory
No.	Name	Abbr.	F	А	S	AAG	AMS	modules
1	Analysis 1	Ana1	9			x		x
2	Linear Algebra 1	LA1	9			х		x
3	Introduction to Programming 1	EP1	4					
4	Analysis 2	Ana2	9			x		x
5	Linear Algebra 2	LA2	9			x		x
6	Algebra	Alg		9		x		x
7	Analysis 3	Ana3		9		x		x
8	Numerical Analysis 1	Num1		9			х	x
9	Probability and Statistics 1	Sto1		9			х	x
10	Analysis 4	Ana4			9	х		
11	Discrete Mathematics 1	DM1			9	x		
12	Fundamentals of Data Analysis with R	R1			6		x	
13	Introduction to Group Theory	Gru1			9	x		
14	Reading Course Algebra	AlgL			6	x		
15	Multidimensional Approximation Theory	МАрр	1	1	9		х	
16	Numerical Analysis 2	Num2			9		х	
17	Optimisation	Opt			9		х	
18	Probability and Statistics	Sto2			9		х	
19	Approximation Theory	Арр			9		х	
20	Computer Algebra	CAlg			9		х	
21	Discrete Mathematics 2	DM2			9	x		
22	Elementary Differential Geometry	EDG			6	x		
23	Financial Engineering	FinE			6		х	
24	Reading Course Analysis Bachelor	AnaL			6	x		
25	Projective Geometry 1	PG1			9	x		
	Calculation Course Algebra/							
26	Group Theory with GAP or MAGMA	Gap			6	x		
27	Advanced Course Analysis Bachelor	AnaS3			6	x		
28	Advanced Course Applied Mathematics 3h	AM3S			6		х	
29	Advanced Course Applied Mathematics 4h	AM4S			9		х	
30	Advanced Course Stochastic Theory	StoS			6		х	
31	Game Theory	Spi			6	x		
32	Statistics and Simulations with R	R2			6		х	
33	Тороlogy	Тор			6	x		
34	Wavelets	Wav		1	9		х	
35	Elementary Partial Differential Equations	EPD		1	9	x		
36	Advanced Course Analysis Bachelor 4 h	AnaS4		1	6	x		
37	Algebra 2	Alg2			9	x		
38	Proseminar	Pro			6	x	х	х
39	Seminar	Sem			6	x	х	х
40	Bachelor thesis	Thes		1	12	x	х	х
41	Reading Course: Algorithmic Algebra	AlaLB		1	6	x		
42	Advanced Module Algebra: Groups, Rings, modules 4+2	GRM42			9	x		
43	Advanced Module Algebra: Groups, Rings, modules 3+1	GRM31			6	x		
44	Reading Course: Groups, Rings, Modules	GRMLB		1	6	x		
45	Advanced Module Algebra: Complex Functions 4+2	KoF42			9	x		
46	Advanced Module Algebra: Complex Functions 3+1	KoF31	1	1	6	X		1

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			-	_	1		
47	Reading Course: Complex Functions	KoFLB		6	х		
48	Number Theory 4+2	ZT42		9	х		
49	Number Theory 3+1	ZT31		6	х		
50	Advanced Course in Discrete Mathematics 4+2	SDM42		9	х		
51	Advanced Course in Discrete Mathematics 3+1	SDM31		6	х		
52	Advanced Course in Discrete Mathematics 2+2	SDM22		6	х		
53	Advanced Course in Discrete Mathematics 2+0	SDM20		3	х		
54	Advanced Course in Geometry 4+2	SGe42		9	х		
55	Advanced Course in Geometry 3+1	SGe31		6	х		
56	Advanced Course in Geometry 2+2	SGe22		6	х		
57	Advanced Course in Geometry 2+0	SGe20		3	х		
58	Advanced Lecture Course in Numerical Analysis	SNu42		9		x	
-	4+2						
59	Advanced Lecture Course in Numerical Analysis 3+1	SNu31		6		×	
60	Advanced Lecture Course in Numerical Analysis	Spu 22		c		~	
60	2+2	Snu22		6		x	
61	Advanced Lecture Course in Numerical Analysis 2+0	SNu20		3		x	
62	Advanced Course in Probability and Statistics 4+2	SSt42		9		х	
63	Advanced Course in Probability and Statistics 2+2 3+1	SSt31		6		x	
64	Advanced Course in Probability and Statistics 2+2	SSt22		6		х	
65	Advanced Course in Probability and Statistics 2+0	SSt20		3		х	
66	Proseminar	Pro		6	х	х	х
67	Seminar Analysis	SemAn		6	х		
68	Seminar Topology	SemTo		6	х		
69	Number Theory	SemZt		6	х		
70	Seminar Algebraic Geometry	SemAG		6	х		
71	Seminar Complex Functions	SemKoF		6	х		
72	Seminar on Algorithmic Algebra	SemAlA		6	х		
73	Seminar on Groups, Rings, Modules	SemGRM		6	х		
74	Seminar in Discrete Mathematics	SemDM		6	х		
75	Seminar in Geometry	SemGe		6	х		
76	Seminar in Numerical Analysis	SemNu		6		x	
77	Seminar in Probability and Statistics	SemSt		6		x	
78	Seminar in Finance	SemFi		6		x	
79	Practical Training	Prak		8	x	х	
80	Preparation for Thesis in Algebra and Geometry	TVAG		4	x		
81	Preparation for Thesis in Analysis	TVAna		4	x		
82	Preparation for Thesis in Applied Mathematics	TVAng		4		x	
83	Thesis Bachelor	Thes		12	x	x	х
	Meaning of abbreviations:		I		1	1	1

Meaning of abbreviations:

F(undamental modules), A(dvanced modules), S(pecialising modules).

AAG: Analysis/Algebra/Geometry; AMS: Applied Mathematics/Stochastic Theory.

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Ana1	Analysis 1 (G)		1 <sup>st</sup> sem.	9 CP			
Module description	Analysis 1						
Module code	07-M/BA-Ana1						
Faculty / subject / department	Faculty 07 / Mathematics / Depar	tment of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 1st semester, Teacher training Mathematics (L3	c Mathematics / 1st semester, acher training Mathematics (L3) / 3rd semester					
Module coordinator	Cf. German version	German version					
Prerequisites for participation	none						
Course aims	<ul> <li>At the end of the module, studen</li> <li>have made the transition f</li> <li>be familiar with logical rea</li> <li>command the fundamenta</li> </ul>	rom school to university	lus of one variable				
Contents of module		one-dimensional differential and ir eorem, fundamental theorem of ca	-				
Forms of instruction	Lecture: 4 h per week, Tutorial:	2 h per week					
Total workload in hours	270	credit points 9 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
•							
B autonomous work in the module							
B autonomous work in	30 h preparation and examination	1					
B autonomous work in the module	Performance during semester: re	gular and successful participation in on and final examination. Weightin		turers.			
B autonomous work in the module C examination Module-component	Performance during semester: re Examination: mid-term examinati	gular and successful participation in on and final examination. Weightin		turers.			
B autonomous work in the module C examination Module-component examinations Frequency,	Performance during semester: re Examination: mid-term examinati Retake examination: written or o Every winter semester,	gular and successful participation in on and final examination. Weightin		turers.			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-LA1	Linear Algebra 1 (G)		1 <sup>st</sup> sem.	9 CP			
Module description	Linear Algebra 1						
Module code	07-M/BA-LA1						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 1st semester, Teacher training Mathematics (L3) / 1st se	mester					
Module coordinator	Cf. German version	f. German version					
Prerequisites for participation	none						
Course aims	<ul> <li>To be familiar with logical reasoning</li> <li>Insights into the deductive method</li> <li>Knowledge of the fundamental struct</li> <li>To learn to understand and apply the (homomorphisms). Knowledge of not</li> </ul>	tures of algebra e concept of structure preserv					
Contents of module	<ul> <li><u>Groups</u> (elementary features)</li> <li><u>Rings</u>: subrings, integers, ring of end</li> <li><u>Fields</u>: real numbers, complex numb</li> <li><u>Vector spaces</u>: linear independence, subspaces, dimension formulas of st</li> <li><u>Linear transformations</u>: kernel, imag transformations, inverse transformations homomorphisms</li> <li><u>Matrices</u>: adding and multiplication, conversions, rank, regularity and sin with a change of basis), matrices as</li> <li><u>Determinants</u>: of matrices and linea determinant, formula for an inverse</li> <li><u>System of linear equations</u>: coefficied</li> </ul>	ers dimension, basis, subspace, o ubspaces, quotient space, R <sup>n</sup> a ge, pre-image, isomorphism, s tion, restricted transformatio inverse, transposed and symi gularity, matrix representatio linear transformations r transformations, multi-linea matrix, Laplace expansion, Cr	quotient space, ( ind C <sup>n</sup> um and product ns, fundamenta metric matrices, n of linear trans rity, theorem of amer's rule	of linear I theorem on elementary formations (esp. multiplication,			
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per w	eek					
Total workload in hours	270	credit points 9 CP					
Consisting of: A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in the module							
C examination	30 h						
Module-component examinations	Performance during semester: regular and Examination: mid-term examination and fi Retake examination: written or oral exami	nal examination. Weighting a		urer.			
Frequency, duration in semesters	Every winter semester, 1 semester						
Intake capacity	200						
Language of instruction	German						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-I-BA-EP1	Introduction to Programming 1	(G) From 1 <sup>st</sup> sem.	onwards	4 CP			
Module description	Introduction to Programming 1						
Module code	07-I-BA-EP1						
Faculty / subject / department	Faculty 07 / Information Technology / Depa	artment of Information Technolog	у				
Applies to degree courses / semesters	BSc Mathematics, 1st semester						
Module coordinator	Cf. German version	German version					
Prerequisites for participation	none						
Course aims	<ul> <li>The students should</li> <li>have knowledge of the constructs of a</li> <li>understand the fundamental concepts</li> <li>have the skill to develop solutions for</li> <li>have knowledge of various programm</li> <li>command the methods used for analy description,</li> <li>be able to evaluate the applicability or</li> </ul>	of programming and application simple programming tasks in a hig ing paradigms, sis and design of small settings of	tasks as well as				
Contents of module	<ul> <li>Introduction to programming languag</li> <li>Introduction to an environment for so</li> <li>Fundamental concepts of higher prog</li> <li>Constants, variables, types of data, po</li> <li>Complex types of data: structures and</li> <li>Control structures, conditions and loo</li> <li>Functions, parameter transfer, results</li> <li>Recursion</li> <li>Classes, objects, instances</li> </ul>	ftware development ramming languages inter arrays ps					
Forms of instruction	Lecture: 2 h per week, Tutorial: 1 h per we	ek					
Total workload in hours	120	credit points 4 CP					
consisting of: A courses	Lecture	Tutorial					
Aa contact hours	30 h	15 h					
Ab preparation / follow- up	15 h	45 h					
B autonomous work in the module							
C examination	15 h preparation and examination						
Module examination	Performance during semester: regular and Examination: written or oral examination.	successful participation in the tut	orials.				
Frequency, duration in semesters	winter semester, summer semester 1 semester						
Intake capacity	50						
Language of instruction	German						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Ana2	Analysis 2 (G)		2 <sup>nd</sup> sem.	9 CP			
Module description	Analysis 2						
Module code	07-M/BA-Ana2						
Faculty / subject / department	Faculty 07 / Mathematics / D	Department of Mathematics					
Applies to degree courses / semesters		c Mathematics / 2nd semester, acher training Mathematics (L3) / 4th semester					
Module coordinator	Cf. German version	German version					
Prerequisites for participation	Knowledge of Analysis 1						
Course aims	At the end of the module, stu calculus in R <sup>n</sup> .	udents should be able to command the	fundamentals of di	fferential and integral			
Contents of module	Differential calculus in R <sup>n</sup> , cu	rves and surfaces in R <sup>n</sup> , introduction to	multidimensional	integration.			
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week					
Total workload in hours	270	credit points 9 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in the module		i					
C examination	30 h preparation and examin	nation					
Module-component examinations	-	er: regular and successful participation in nination and final examination. Weightin or oral examination.		urers.			
Frequency,	Every summer semester,						
duration in semesters	1 semester						
duration in semesters Intake capacity	1 semester 200						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-LA2	Linear Algebra 2 (G)		2 <sup>nd</sup> sem.	9 CP			
Module description	Linear Algebra 2						
Module code	07-M/BA-LA2						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 2nd semester, Teacher training Mathematics (L3) / 2 <sup>nd</sup> se	Sc Mathematics / 2nd semester, eacher training Mathematics (L3) / 2 <sup>nd</sup> semester					
Module coordinator	Cf. German version	German version					
Prerequisites for participation	Knowledge of Linear Algebra 1						
Course aims	Acquiring a more profound knowledge of	the objectives stated in the	module Linear Al	gebra 1			
Contents of module	<ul> <li><u>Rings</u>: particularly polynomial rings,</li> <li><u>Eigenvalues</u>: eigenvector, eigenspac polynomial, Cayley-Hamilton, Jordan</li> <li><u>Scalar products</u>: Euclidean and unita orthogonal, unitary and self-adjoint</li> </ul>	e, multiplicity, diagonalisat n normal form ary vector spaces, orthogon	ality, orthonorma				
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per w	eek					
Total workload in hours	270	credit points 9 CP					
consisting of: A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in the module							
C examination.	30 h						
Module-component examinations	Performance during semester: regular and Examination: mid-term examination and f Retake examination: written or oral exami	inal examination. Weightin		urer.			
Frequency, duration in semesters	Every summer semester, 1 semester						
Intake capacity	200						
Language of instruction	German						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Alg	Algebra (A)		3 <sup>rd</sup> or 5 <sup>th</sup> sem.	9 CP			
Module description	Algebra						
Module code	07-M/BA-Alg						
Faculty / subject / department	Faculty 07 / Mathematics / Departmen	t of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 3rd or 5th semester						
Module coordinator	Cf. German version	f. German version					
Prerequisites for participation	Knowledge of Linear Algebra 1, Linear	nowledge of Linear Algebra 1, Linear Algebra 2					
Course aims	<ul> <li>Skill to calculate with cycles in perr</li> <li>Identification of isomorphisms beth</li> <li>Skill to apply the Sylow theorem (e</li> <li>Recognition of irreducibility of poly</li> <li>Determination of the splitting field</li> </ul>	ween groups g. to construct a normal sub nomials and of the Galois group of a	a polynomial in simple				
Contents of module	<ul> <li>operation of groups on sets, conjug groups, symmetric groups, cycle no</li> <li><u>Rings</u>, subrings, ideals, factor rings, division algorithm, criteria for irred</li> <li><u>Fields</u>, subfields, characteristics, pr</li> </ul>	s, Subgroups, normal subgroups, factor groups, fundamental theorem on homomorphisms, ion of groups on sets, conjugation, Sylow theorems, automorphism groups of structures, cyclic , symmetric groups, cycle notation, solvable groups. subrings, ideals, factor rings, fundamental theorem on homomorphisms, polynomial rings, n algorithm, criteria for irreducibility of polynomials, quotient fields. subfields, characteristics, prime fields, field automorphisms, field expansions, splitting fields, group (of a field expansion and an equation), fundamental theorem of Galois theory, finite fields.					
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h pe	r week					
Total workload in hours	270	credit points 9 CP					
consisting of: A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in							
the module							
c examination	30 h preparation and examination						
	30 h preparation and examination Performance during semester: regular Examination: mid-term examination ar Retake examination: written or oral ex	d final examination. Weight		rer.			
C examination Module-component	Performance during semester: regular Examination: mid-term examination ar	d final examination. Weight		rer.			
C examination Module-component examinations Frequency,	Performance during semester: regular Examination: mid-term examination ar Retake examination: written or oral ex Every winter semester,	d final examination. Weight		rer.			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Ana3	Analysis 3 (A)		3 <sup>rd</sup> or 5 <sup>th</sup> sem.	9 CP			
Module description	Analysis 3						
Module code	07-M/BA-Ana3						
Faculty / subject / department	Faculty 07 / Mathematics / Depart	ment of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 3rd or 5th seme	ester					
Module coordinator	Cf. German version	German version					
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2	2					
Course aims	Application of fundamental theore statements about solutions (calcula theorems of the theory of function integrals with the residue theorem	ation, asymptotic behaviour, pha s of a complex variable, calculat	ase portraits). Applicat ion of line integrals, ca	ion of fundamental Iculation of real			
Contents of module	Systems of ordinary differential equation, initial and boundary value problems, flow, linear and simple non- linear systems, stability. Complex and real differentiability, line integrals, Cauchy's integral theorem and formula, analyticity of holomorphic functions, theorem of identity, analytic continuation, exponential functions and logarithm, isolated singularities, Laurent series, residue theorem with applications, calculation of integrals.						
Forms of instruction	Lecture: 4 h per week, Tutorial: 2	h per week					
Total workload in hours	270	credit points 9 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Performance during semester: reg Examination: mid-term examinatio Retake examination: written or ora	n and final examination. Weight		er.			
Frequency,	Every winter semester,						
duration in semesters	1 semester						
Intake capacity	200						
Language of instruction	German						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Num1	Numerical Analysis 1 (	A)	3 <sup>rd</sup> or 5 <sup>th</sup> sem.	9 CP		
Module description	Numerical Analysis 1					
Module code	07-M/BA-Num1					
Faculty / subject / department	Faculty 07 / Mathematics / De	aculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 3rd or 5th s BSc Physics / 3rd semester	Sc Mathematics / 3rd or 5th semester, Sc Physics / 3rd semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Analy	ysis 2, Linear Algebra 1, Linear Algeb	ora 2			
Course aims	mathematically (regarding con	The skill to understand methods (algorithms) of numerical and applied analysis, analyse them mathematically (regarding convergence, stability, etc.) and apply them; the skill to develop, implement and evaluate methods; computer-assisted problem-solving.				
Contents of module	Polynomial interpolation: solva Splines: spline space, B-splines Finding of roots: bisection met	of linear equations: Jacobi/Gauss-Se ability, Lagrange form, Newton form	n, divided differences; method;			
Forms of instruction	Lecture: 4 h per week, Tutoria	al: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examina	tion				
Final module examinations	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.					
Frequency, duration in semesters	Every winter semester, 1 semester	Every winter semester,				
Intake capacity	150					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Sto1	Statistics 1 (A)		3 <sup>rd</sup> or 5 <sup>th</sup> sem.	9 CP		
Module description	Probability and Statistics 1					
Module code	07-M/BA-Sto1					
Faculty / subject / department	Faculty 07 / Mathematics / Department of	culty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 3rd or 5th semester					
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2 and Lir	ear Algebra 1, Linear Alg	ebra 2			
Course aims	should be able to apply methods of model	The students should have knowledge of the fundamental terms and propositions of stochastic theory, should be able to apply methods of modelling of the applied probability theory to practice-oriented examples, should command the fundamental inference concepts of statistics and apply them to data evaluation.				
Contents of module	Fundamentals of probability theory as the concept of probability, conditional probability, combinatorics, independence, random variables, probability distribution, distribution function, densities, expectation, moments, correlation, laws of large numbers, central limit theorem. Fundamentals of statistics as parameter estimation, maximum likelihood estimation, confidence intervals, statistic tests, tests in normal distribution models.					
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per w	eek				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examination					
Module-component examinations	Performance during semester: regular and successful participation in the tutorials. Examination: mid-term examination and final examination. Weighting according to lecturer. Retake examination: written or oral examination.					
Frequency,	Every winter semester,					
duration in semesters	1 semester					
Intake capacity	200					
Language of instruction	German					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Ana4	Analysis 4 (S)		4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP		
Module description	Analysis 4					
Module code	07-M/BA-Ana4					
Faculty / subject / department		inculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th	BSc Mathematics / 4th or 6th semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Ana	lysis 2, Analysis 3, Linear Algebra 1, Lir	near Algebra 2			
Course aims	The students should be able t	The students should be able to deal with Lebesgue integration and Hilbert and Banach spaces.				
Contents of module	Lebesgue integration, Hilbert hyperbolic and parabolic part	and Banach spaces, Fourier series and ial differential equations.	d Fourier transform, lii	near elliptic,		
Forms of instruction	Lecture: 4 h per week, Tutor	ial: 2 h per week				
Forms of instruction Total workload in hours	Lecture: 4 h per week, Tutor	ial: 2 h per week credit points 9 CP				
Total workload in hours						
Total workload in hours						
Total workload in hours consisting of:	270	credit points 9 CP				
Total workload in hours consisting of: A courses	270 Lecture	credit points 9 CP Tutorial				
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow-	270 Lecture 60 h	credit points 9 CP Tutorial 30 h				
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in	270 Lecture 60 h	credit points 9 CP Tutorial 30 h 90 h				
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module	270 Lecture 60 h 60 h 30 h preparation and examina	credit points 9 CP Tutorial 30 h 90 h ation	in the tutorials.			
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination	270 Lecture 60 h 60 h 30 h preparation and examina Performance during semester	credit points 9 CP Tutorial 30 h 90 h ation	in the tutorials.			
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination Module examination Frequency,	270 Lecture 60 h 60 h 30 h preparation and examination Performance during semester Examination: written or oral of Every summer semester,	credit points 9 CP Tutorial 30 h 90 h ation	in the tutorials.			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-DM	Discrete Mathemati	cs 1 (S)	4 <sup>th</sup> sem.	9 CP		
Module description	Discrete Mathematics 1					
Module code	07-M/BA-DM					
Faculty / subject / department	Faculty 07 / Mathematics /	aculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 4th sem	ester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Linear Algebr	Knowledge of Linear Algebra 1, Algebra				
Course aims	techniques).	Fundamentals of counting theory (knowledge of the elementary counting coefficients and counting techniques). Inplementation of problems into the language of graph theory, command of techniques.				
Contents of module	example generating function	efficients, inclusion-exclusion, further co ons, Möbius inversion formula, cycle indic ls, classical topics as for example trees, n	ces.	and methods as for		
Forms of instruction	Lecture: 4 h per week, Tut	orial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h					
Module examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.					
Frequency,	Every other summer semes	ter,				
duration in semesters	1 semester					
Intake capacity	200					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-R1	Fundamentals of Data Analysis w	rith R (V)	4 <sup>th</sup> sem.	6 CP		
Module description	Fundamentals of Data Analysis with R					
Module code	07-M/BA-R1					
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	athematics				
Applies to degree courses / semesters	BSc Mathematics / 4th semester	BSc Mathematics / 4th semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Probability and Statistics 1					
Course aims	<ul> <li>With the help of real data, the students learn the practical fundamentals of statistic data analysis as well as a handling of the "open-source" software R and should</li> <li>know the fundamental data structures in R as well as possibilities of import and export of data,</li> <li>be familiar with a numerical and particularly graphical exploratory data analysis in R,</li> <li>be able to implement new functions in R,</li> <li>command applied inference statistics (tests and parameter estimation in basic univariate uni- and multi sample problems) for continual and discrete data.</li> </ul>					
Contents of module	<ul> <li>Introduction to the R-environment</li> <li>Data structures in R as well as import and export of data</li> <li>Elemental exploratory data analysis with R incl. theory</li> <li>Fundamentals of programming in R and graphics</li> <li>R-functions for the inference statistics of selected para- and non-parametric, univariate uni- and multi-sample problems (incl. recapitulation of some theoretical basics)</li> </ul>					
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h per wee	k				
Total workload in hours	180	credit points 6 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	30 h	30 h				
Ab preparation / follow- up	30 h	50 h				
B autonomous work in the module						
C examination	30 h (either examination preparation and ex	amination, or project wi	th report and pres	entation)		
Module examination	Performance during semester: regular participation in the tutorials and regular presentation of exercises. Examination: either examination or project with report and presentation (depending on decision of module coordinator).					
Frequency, duration in semesters	Every summer semester, 1 semester	Every summer semester,				
Intake capacity	20					
Language of instruction	German (by request in English)					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Gru	Group Theory (V)		4 <sup>th</sup> sem.	9 CP		
Module description	Introduction to Group Theor	Ý				
Module code	07-M/BA-Gru1					
Faculty / subject / department	Faculty 07 / Mathematics / D	culty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 3 <sup>rd</sup> semes	Sc Mathematics / 3 <sup>rd</sup> semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Linear Algebra	nowledge of Linear Algebra 1, Linear Algebra 2, Algebra				
Course aims	• The skill to compute grou	• The skill to compute group characters in simple cases				
Contents of module		oups groups (Maschke's theorem, Schur's Le ns by generators and relations	emma, group chara	cters)		
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examin	ation				
Module examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.					
Frequency,	Every other summer semeste	Every other summer semester,				
duration in semesters	1 semester					
Intake capacity	30					
Language of instruction	German					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-AlgL	Reading Course Algebra (V)		6 <sup>th</sup> sem.	6 CP		
Module description	Reading Course Algebra					
Module code	07-M/BA-AlgL	7-M/BA-AlgL				
Faculty / subject / department	Faculty 07 / Mathematics / Department o	f Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 3 <sup>rd</sup> semester	Sc Mathematics / 3 <sup>rd</sup> semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Algebra, Introduction to Gr	oup Theory				
Course aims	<ul><li>The skill to complete drafted proofs</li><li>The skill to analyse a counter-example</li></ul>	The skill to complete drafted proofs The skill to analyse a counter-example				
Contents of module	<ul> <li>E.g.</li> <li>Topics from representation theory</li> <li>Finite groups</li> <li>Geometric group theory</li> <li>Classic groups and metric spaces</li> <li>Buildings and groups of Lie type</li> </ul>					
Forms of instruction	Reading course: 2 h per week					
Total workload in hours	180	credit points 6 CP				
consisting of:						
A courses	Reading course					
Aa contact hours	30 h					
Ab preparation / follow- up	135 h					
B autonomous work in the module						
C examination	15 h preparation and examination					
Module examination	Written or oral examination					
Frequency,	irregular					
duration in semesters	1 semester					
Intake capacity	10					
Language of instruction	English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-MApp	Multidimensional App	roximation Theory (V)	From 3 <sup>rd</sup> sem. onwards	9 CP		
Module description	Multidimensional Approximati	on Theory				
Module code	07-М/ВА-МАрр					
Faculty / subject / department	Faculty 07 / Mathematics / De	partment of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / from 3rd se MSc Mathematics	Sc Mathematics / from 3rd semester onwards, /ISc Mathematics				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Analy	ısis 2, Linear Algebra 1, Linear Alg	gebra 2			
Course aims	The skill to apply and analyse a uniqueness, convergence.	approximation methods as well a	s their mathematical analysis: exist	ence,		
Contents of module	Fundamentals of multidimensi Polynomial approximation, spl Approximation with spaces of		nsional wavelets.			
Forms of instruction	Lecture: 4 h per week, Tutoria	al: 2 h per week				
Total workload in hours	270	credit points 9	СР			
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examina	tion				
Module examination	Performance during semester: Examination: written or oral ex	regular and successful participat xamination.	tion in the tutorials.			
Frequency, duration in semesters	winter semester, irregular, 1 semester					
Intake capacity	150					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Num2	Numerical Analysis 2	(V)	4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP		
Module description	Numerical Analysis 2					
Module code	07-M/BA-Num2					
Faculty / subject / department	Faculty 07 / Mathematics / De	epartment of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th BSc Physics / 4th semester	ic Mathematics / 4th or 6th semester, ic Physics / 4th semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1 - 2, Li	inear Algebra 1 - 2, Numerical Analysi	is 1			
Course aims	mathematically (regarding con	The skill to understand methods (algorithms) of numerical and applied analysis, analyse them mathematically (regarding convergence, stability, etc.) and apply them; the skill to develop, implement and evaluate methods; computer-assisted problem-solving.				
Contents of module	Solving of ordinary differential equations; Additional methods for solving systems of linear equations; Advanced methods of numerical mathematics.					
Forms of instruction	Lecture: 4 h per week, Tutori	ial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examina	ition				
Module examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.					
Frequency,	Every summer semester,					
duration in semesters	1 semester					
Intake capacity	150					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Opt	Optimisation (V)		4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP		
Module description	Optimisation					
Module code	07-M/BA-Opt					
Faculty / subject / department	Faculty 07 / Mathematics / I	culty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters		Sc Mathematics / 4th or 6th semester, Sc Physics / 4th or 6th semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, An	alysis 2, Linear Algebra 1, Linear Algebi	ra 2			
Course aims		Understanding the design of optimisation methods, as well as their application and mathematical analysis: questions of convergence, complexity, reliability.				
Contents of module	optimisation without constru	algorithm, transportation problems, ir aints: Quasi-Newton algorithms, algori Cuhn-Tucker conditions and algorithms, ts: penalty algorithms.	thms of DFP and BFGS;			
Forms of instruction	Lecture: 4 h per week, Tuto	orial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examin	nation				
Module examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.					
Frequency,	Every summer semester,					
duration in semesters	1 semester					
Intake capacity	150					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Sto2	Statistics 2 (V)		4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP		
Module description	Probability and Statistics 2					
Module code	07-M/BA-Sto2					
Faculty / subject / department	Faculty 07 / Mathematics /	aculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 4th or 6	th semester				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Ar	nalysis 2, Linear Algebra 1, Linear Algebr	a 2, Stochastic Theory	1		
Course aims	apply methods of modelling	The students should have knowledge of terms and propositions of multivariate statistics, should be able to apply methods of modelling of multivariate statistics in case studies and adopt methods of multivariate statistics in complex data situations of statistical inference.				
Contents of module		y theory concerning multivariate proble ultidimensional normal distributions, ve est				
Forms of instruction	Lecture: 4 h per week, Tute	orial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and exami	nation				
Module examination	-	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.				
Frequency, duration in semesters	Every summer semester, 1 semester	Every summer semester,				
Intake capacity	200					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-М/ВА-Арр	Approximation Theor	y (V)	5 <sup>th</sup> sem.	9 CP		
Module description	Approximation Theory					
Module code	07-М/ВА-Арр					
Faculty / subject / department	Faculty 07 / Mathematics / Do	culty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 5th semes MSc Physics	Sc Mathematics / 5th semester, ISc Physics				
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge of Analysis 1, Ana	nowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2				
Course aims	The skill to apply and analyse uniqueness, convergence.	he skill to apply and analyse approximation methods as well as their mathematical analysis: existence, niqueness, convergence.				
Contents of module	Minimax approximations; Spline approximation / appro	ion theory; oproximation order (Jackson theorem ximations with rational functions; tion / approximation with translation-				
Forms of instruction	Lecture: 4 h per week, Tutor	ial: 2 h per week				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examination	ation				
Module examination		Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.				
Frequency,	Every other winter semester,					
duration in semesters	1 semester					
Intake capacity	150					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-CAlg	Computer Algebra (	V)	4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP	
Module description	Computer Algebra				
Module code	07-M/BA-CAlg				
Faculty / subject / department	Faculty 07 / Mathematics /	Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 4th or 6 MSc Mathematics, BSc Physics				
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Analysis 1, Ar	owledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2			
Course aims	Understanding the fundame application.	Inderstanding the fundamental concepts of an efficient computer algebra relevant to problems of pplication.			
Contents of module	Calculation with univariate Multivariate polynomials ar	Integer arithmetic and rational arithmetic; Calculation with univariate polynomials; Multivariate polynomials and constructive ideal theory; Solving of polynomial systems of equations.			
Forms of instruction	Lecture: 4 h per week, Tut	orial: 2 h per week			
Total workload in hours	270	credit points 9 CP			
consisting of:					
A courses.	Lecture	Tutorial			
Aa contact hours	60 h	30 h			
Ab preparation / follow- up	60 h	90 h			
B autonomous work in the module					
C examination	30 h preparation and exami	ination			
Module examination	Performance during semest Examination: written or ora	ter: regular and successful participation in al examination.	n the tutorials.		
Frequency,	Every other summer semes	ter,			
duration in semesters	1 semester				
Intake capacity	50				
	German or English				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Kom	Linear Algebra in Combinatorics	From 4 <sup>th</sup> sem. onwards	9 CP			
Module description	Linear Algebra Methods in Combinatorics					
Module code	07-M/BA-Kom					
Faculty / subject / department	Faculty 07 / Mathematics / Department of	culty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 4th semester	Sc Mathematics / 4th semester				
Module coordinator	Cf. German version	f. German version				
Prerequisites for participation	Knowledge of Linear Algebra	nowledge of Linear Algebra				
Course aims	Students get in insight into the application	of linear algebra in order to solve combinatori	al questions.			
Contents of module	<ol> <li>Incidence structures, block designs</li> <li>Strongly regular graphs</li> <li>Dimension arguments</li> <li>Eigenvalue techniques</li> <li>Incidence matrices</li> </ol>					
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h per we	ek				
Total workload in hours	180	credit points 6 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	30 h	30 h				
Ab preparation / follow- up	30 h	60 h				
B autonomous work in the module						
C examination	30 h preparation and examination					
Module examination	Examination: written or oral examination.					
Frequency, duration in semesters	irregular, every 4 <sup>th</sup> semester					
Intake capacity	200					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-EDG	Elementary Differen	tial Geometry (V)	5 <sup>th</sup> sem.	6 CP	
Module description	Elementary Differential Geo	ometry			
Module code	07-M/BA-EDG				
Faculty / subject / department	Faculty 07 / Mathematics /	Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 5th seme	3Sc Mathematics / 5th semester			
Module coordinator	Th. Bartsch	h. Bartsch			
Prerequisites for participation	Knowledge of Analysis 1, An	nalysis 2			
Course aims	The students should be fam	iliar with curves and surfaces in sp	ace as well as with their	internal geometry.	
Contents of module	<ul> <li>Curves and surfaces</li> <li>Riemannian metric</li> <li>Concepts of curvature</li> <li>Gaussian theorem (the</li> </ul>	eorema egregium)			
Forms of instruction	Lecture: 3 h per week, Tuto	orial: 1 h per week			
Total workload in hours	180	credit points 6	СР		
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	45 h	15 h			
Ab preparation / follow- up	45 h	45 h			
B autonomous work in the module					
C examination	30 h preparation and exami	nation			
Module examination	Performance during semest Examination: written or ora	er: regular and successful participa l examination.	tion in the tutorials.		
Frequency, duration in semesters	Winter semester, irregular, 1 semester				
Intake capacity	200				
Language of instruction	German / English				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-FinE	Financial Engineerin	g (S)	5 <sup>th</sup> sem.	6 CP	
Module description	Financial Engineering				
Module code	07-M/BA-FinE				
Faculty / subject / department	Faculty 07 / Mathematics /	Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 5th sem	ester			
Module coordinator	Cf. German version	f. German version			
Prerequisites for participation	Knowledge of Analysis 1 - 2	nowledge of Analysis 1 - 2, Linear Algebra 1 - 2 and Stochastic Theory 1 - 2			
Course aims	fundamental products as op Financial markets in discret	The students should know fundamental concepts and statements of financial mathematics: description of Fundamental products as options, assets, credit products, shares and indices. Financial markets in discrete time and finite state spaces. Evaluation of derivatives and risk calculation in these models, hedging.			
Contents of module					
Forms of instruction	Lecture: 3 h per week, Tut	orial: 1 h per week			
Total workload in hours	180	credit points 6 CP			
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	45 h	15 h			
Ab preparation / follow- up	45 h	45 h			
B autonomous work in the module		I			
C examination	30 h preparation and exami	nation			
Module examination	Performance during semest Examination: written or ora	er: regular and successful participation I examination.	in the tutorials.		
Frequency,	Every winter semester,				
duration in semesters	1 semester				
Intake capacity	200				
Language of instruction	German				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-AnaL	Reading Course Analysis Bachelo	$\mathbf{f}(\mathbf{S}) \qquad 4^{\mathrm{th}}  \mathrm{or}  5^{\mathrm{th}}  \mathrm{sem}.$	6 CP			
	Pooding Course Apolysis Posteller					
Module description	Reading Course Analysis Bachelor					
Module code	07-M/BA-AnaL					
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	athematics				
Applies to degree courses / semesters	BSc Mathematics / 4th or 5th semester					
Module coordinator	Cf. German version	Cf. German version				
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Analysis	3				
Course aims	Independent study of course literature with a learned.	nalysis and addition of proofs; pres	entation of the subjects			
Contents of module	E.g. regarding the topic "Submanifolds and the orientation, compact sets with smooth bound identities, examples. Or e.g. regarding the topic "Partial differentia distributions, fundamental solution, inhomog value problems.	lary, integration on submanifolds, G I equations" – linear partial differer	Gaussian theorem, Green's			
Forms of instruction	Reading course: 2 h per week					
Total workload in hours	180	credit points 6 CP				
consisting of: A courses	Reading course					
Aa contact hours	30 h					
Ab preparation / follow- up	60 h					
B autonomous work in the module	75 h independent study of literature					
C examination	15 h preparation and examination					
Module examination	Written or oral examination					
	Every summer semester,					
Frequency,						
Frequency, duration in semesters	1 semester					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Geo	Geometry (V)		5 <sup>th</sup> sem.	9 CP
Module description	Projective Geometry 1			
Module code	07-M/BA-PG1			
Faculty / subject / department	Faculty 07 / Mathematics / Departmer	t of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester of	Sc Mathematics / from 4 <sup>th</sup> semester onwards		
Module coordinator	Cf. German version	. German version		
Prerequisites for participation	Knowledge of fundamental lectures	nowledge of fundamental lectures		
Course aims	Students should be familiar with basic	concepts and structures of gec	ometry	
Contents of module	<ol> <li>Affine and projective spaces</li> <li>Metric spaces (spherical, euc discrete symmetry groups</li> <li>[optional] basic differential ge</li> <li>[optional] basic algebraic geo</li> <li>[optional] elliptic, euclidean,</li> </ol>	lidean and hyperbolic metric) eometry pmetry	); regular point sys	stems/ latttices;
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h pe	er week		
Total workload in hours	270	credit points 9 CP		
consisting of: A courses Aa contact hours	Lecture 60 h	Tutorial 30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module examination	Performance during semester: regular Examination: written or oral examinat		the tutorials.	
Frequency, duration in semesters	Irregular, winter semester, approx. events 1 semester	ery 4 <sup>th</sup> semester		
Intake capacity	50			
Language of instruction	German/English			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Gap	Calculation Course Algebra/Group GAP or MAGMA (V)	Theory with	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Calculation Course Algebra/Group Theory with	GAP or MAGMA		
Module code	07-M/BA-Gap			
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	hematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onward	5		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra 1, Linear Algebra	2, Algebra, Introdu	ction to Group Theory	
Course aims	<ul> <li>Skill to use scientific software (computer al</li> <li>Skill to implement group theoretical proble</li> </ul>		anguage	
Contents of module	<ul> <li>On the basis of the knowledge gained in Algeb algebra system (e.g. GAP or MAGMA):</li> <li>Working with basic objects, as groups, ring</li> <li>Working with transformations (injective fu homomorphisms)</li> <li>Working with representations</li> <li>Working with free groups and groups built</li> <li>Implementation of simple algorithms</li> <li>Usage of complex algorithms, e.g. Todd-Complex algorithms</li> </ul>	s, fields, vector spa nction, surjective fu by presentations	ces, their elements and substructu	
Forms of instruction	Tutorial: 2 h per week			
Total workload in hours	180	credit points 6 CP		
consisting of:				
A courses	Tutorial			
Aa contact hours	30 h			
Ab preparation / follow- Up	90 h			
B autonomous work in the module	60 h term paper			
C examination				
Module-component examinations	Term paper (solving a mathematical problem)			
Frequency,	Every other winter semester,			
duration in semesters	1 semester			
Intake capacity	10			
Language of instruction	German			

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Spi	Game Theory (V)		From 5 <sup>th</sup> sem. onwards	6 CP		
Module description	Game Theory					
Module code	07-M/BA-Spi					
Faculty / subject / department	Faculty 07 / Mathematics / De	aculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / 5th semest MSc Mathematics in Practice	3Sc Mathematics / 5th semester, ASc Mathematics in Practice				
Module coordinator	Cf. German version	f. German version				
Prerequisites for participation	Knowledge of Analysis 1, Analy	Xnowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2				
Course aims	Knowledge of the fundamenta	Il concepts of game the	eory and of the theorems of equilibr	ium.		
Contents of module	Fundamentals of game theory; Two-player games; determination of optimal strategies; Multiple-player games; Nash equilibrium; dictator theorem; Distribution in multiple-player games.					
Forms of instruction	Lecture: 3 h per week, Tutoria	al: 1 h per week				
Total workload in hours	180	credit po	pints 6 CP			
consisting of:						
A courses.	Lecture	Tutorial				
Aa contact hours	45 h	15 h				
Ab preparation / follow- Up	45 h	45h				
B autonomous work in the module						
C examination	30 h preparation and examina	tion				
Module examination	Performance during semester: Examination: written or oral ex	-	I participation in the tutorials.			
Frequency,	Every other winter semester,					
duration in semesters	1 semester					
Intake capacity	30					
Language of instruction	German or English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-R2	Statistics and Simulations v	vith R (V)	5 <sup>th</sup> sem.	6 CP	
Module description	Statistics and Simulations with R				
Module code	07-M/BA-R2				
Faculty / subject / department	Faculty 07 / Mathematics / Departme	ent of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 5th semester	3Sc Mathematics / 5th semester			
Module coordinator	Cf. German version	Cf. German version			
Prerequisites for participation	Knowledge of Probability and Statistics 1, Probability and Statistics 2, Fundamentals of Data Analysis with R				
Course aims	<ul> <li>The students learn the usage of statistical techniques as well as the realisation of the Monte Carlo method the "open-source" software R and should</li> <li>command applied inferential statistics for selected univariate uni- and multi-sample problems as well a for simple linear regression,</li> <li>be able to use probability distributions and the generation of pseudorandom numbers in R,</li> <li>know principles and problems as well as R-specific advantages and disadvantages of various implementations of simulation.</li> <li>be familiar with examples for simulation studies,</li> <li>be able to present simulation studies and their results.</li> </ul>				
Contents of module	<ul> <li>R-functions for inferential statistics of selected para- and non-parametric univariate uni- and multi-sample problems (incl. recapitulation of some theoretical bascis)</li> <li>Introduction to simple linear regression with R</li> <li>R-functions probability distributions and pseudo-random numbers</li> <li>Simulation of the "strong law of large numbers" in several examples</li> <li>A variety of simulations on the basis of "random walks", e.g. for ruin problems, childbirth processes, trees, Markov chains</li> </ul>				
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h	per week			
Total workload in hours	180	credit points 6	СР		
consisting of: A courses	Lecture	Tutorial			
Aa contact hours	30 h	30 h			
Ab preparation / follow- up	30 h	60 h			
B autonomous work in the module					
C examination	30 h (either examination preparation	and examination, or pro	ject with report and pres	entation)	
Module examination	Performance during semester: regula Examination: either examination or p coordinator).				
Frequency, duration in semesters	Every winter semester, 1 semester				
Intake capacity	20				
Language of instruction	German (by request in English)				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-М/ВА-Тор	Topology (v)	From 4 <sup>th</sup> sem. onwards	6 CP		
Module description	Topology				
Module code	07-М/ВА-Тор				
Faculty / subject / department	Faculty 07 / Mathematics / Department	of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 5th semester				
Module coordinator	Cf. German version	Cf. German version			
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2				
Course aims	The students should have knowledge of important classes of topological spaces.	the fundamental terms and propositions of to	pology as well as		
Contents of module	<ul> <li>Topological spaces and continuous</li> <li>Sums, products, quotients</li> <li>Compactness</li> <li>Extension theorems by Tietze and</li> <li>Fundamental Group</li> </ul>				
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h per	week			
Total workload in hours	180	credit points 6 CP			
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	45 h	15 h			
Ab preparation / follow- up	45 h	45 h			
B autonomous work in the module					
C examination	30 h preparation and examination				
Module examination	Performance during semester: regular a Examination: written or oral examinatio	nd successful participation in the tutorials. n.			
Frequency, duration in semesters	Irregular, approx. every other winter se 1 semester	mester,			
Intake capacity	200				
Language of instruction	German / English				
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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Wav	Wavelets (V)		4 <sup>th</sup> or 6 <sup>th</sup> sem.	9 CP	
Module description	Wavelets				
Module code	07-M/BA-Wav				
Faculty / subject / department	Faculty 07 / Mathematics / D	Department of Mathematics			
Applies to degree courses / semesters		Sc Mathematics / 4th or 6th semester, Sc Physics / 4th or 6th semester, ISc Mathematics			
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Analysis 1, Ana	nowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2			
Course aims		nowledge of the concept of wavelets and their analysis; application, development and evaluation of umerical methods on the basis of wavelets.			
Contents of module	Spline wavelets, Daubechies	Introduction to time-frequency analysis, Gabor transform; Spline wavelets, Daubechies wavelets; Multivariate wavelets and pre-wavelets, shift-invariant spaces; Filter banks.			
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week			
Total workload in hours	270	credit points 9 CP			
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	60 h	30 h			
Ab preparation / follow- up	60 h	90 h			
B autonomous work in the module					
C examination	30 h preparation and examin	nation			
Module examination	Performance during semeste Examination: written or oral	er: regular and successful participation examination.	in the tutorials.		
Frequency, duration in semesters	Every other summer semester	er,			
Intake capacity	50				
Language of instruction	German or English				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-EPD	Elementary Partial Di	fferential Equations (S)	From 4 <sup>th</sup> sem. onwards	9 CP	
Module description	Elemental Partial Differential	Equations			
Module code	07-M/BA-EPD				
Faculty / subject / department	Faculty 07 / Mathematics / D	epartment of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / from 4th	Sc Mathematics / from 4th semester onwards			
Module coordinator	Cf. German version				
Prerequisites for participation	Analysis 1 – 3, Linear Algebra	1, 2 or comparable knowledge			
Course aims		familiar with the most important s as well as with classical methods	kinds of linear partial differential equ s for their solution.	uations	
Contents of module	- Equations of first and secon - Boundary value problems - Harmonic functions	id order			
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week			
Total workload in hours	270	credit points 9	СР		
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	60 h	30 h			
Ab preparation / follow- up	60 h	90 h			
B autonomous work in the module					
C examination	30 h preparation and examin	ation			
Module-component examinations	Performance during semeste Examination: written or oral	r: regular and successful participate examination.	tion in the tutorials.		
Frequency, duration in semesters	Irregular, about every fourth 1 semester	semester,			
Intake capacity	200				
Language of instruction	German / English				

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Alg2	Algebra 2 (S)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Algebra 2		
Module code	07-M/BA-Alg2		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards		
Module coordinator	Cf. German version		
Prerequisites for participation	Knowledge of Linear Algebra 1, Linear Algebra 2, Algebra		
Course aims	The students shall acquire a more profound knowledge of a central area of algebra. Especially, they will become familiar with algebraic ways of thinking which require a higher level of abstraction.		
Contents of module	- Commutative algebra - Modules over rings - Universal structures		
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per week		
Total workload in hours	270	credit points 9 CP	
consisting of:			
A courses	Lecture	Tutorial	
Aa contact hours	60 h	30 h	
Ab preparation / follow- up	60 h	90 h	
B autonomous work in the module			
C examination	30 h preparation and examination		
Module-component examinations	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.		
Frequency, duration in semesters	Every other summer semester, 1 semester		
Intake capacity	30		
	German		

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07-M/BA-San42	Advanced Course in Analysis 4+	·2 (V) F	rom 5 <sup>th</sup> sem. onwards	9 CP
Module description	Advanced Course in Analysis 4+2			
Module code	07-M/BA-San42			
Faculty / subject / department	Faculty 07 / Mathematics / Department of I	Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwa	vards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Analysis 1-3			
Course aims	Acquiring a more profound knowledge of A	Analysis – interi	nediate level	
Contents of module	Special fields of analysis, e.g. Differential Ge Dynamics, etc.	eometry, Bifur	cation Theory, Differential Equa	ations, Chaotic
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per we	eek		
Total workload in hours	270	credit point	s 9 CP	
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	irregular 1 semester			
duration in semesters	I Semester			
duration in semesters Intake capacity	200			

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07-M/BA-San31	Advanced Course in Analysis	s 3+1 (V)	From 5 <sup>th</sup> sem. onwards	6 CP
Module description	Advanced Course in Analysis 3+1			
Module code	07-M/BA-San31			
Faculty / subject / department	Faculty 07 / Mathematics / Departme	nt of Mathem	atics	
Applies to degree courses / semesters	BSc Mathematics / from 5th semester	onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Analysis 1-3			
Course aims	Acquiring a more profound knowledge	e of Analysis –	intermediate level	
Contents of module	Special fields of analysis, e.g. Different Dynamics, etc.	tial Geometry	Bifurcation Theory, Differential Equa	ations, Chaotic
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h p	er week		
Total workload in hours	180	credit	points 6 CP	
consisting of:				
A courses	Lecture	Tutoria	I	
Aa contact hours	45 h	15 h		
Ab preparation / follow- up	45 h	45 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	irregular 1 semester			
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-STo42	Advanced Course Topology 4	l+2 (V)	From 5 <sup>th</sup> sem. onwards	9 CP
Module description	Advanced Course in Topology 4+2			
Module code	07-M/BA-STo42			
Faculty / subject / department	Faculty 07 / Mathematics / Departmen	t of Mathematic	S	
Applies to degree courses / semesters	BSc Mathematics / from 5th semester of	onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Analysis 1-3, basic ideas (	of topology		
Course aims	Acquiring a more profound knowledge	of topology – int	ermediate level	
Contents of module	Special fields of topology, e.g. algebraic analysis, etc	c topology, differ	ential topology, topological metho	ods of nonlinear
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h pe	er week		
Total workload in hours	270	credit poi	ints 9 CP	
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	irregular 1 semester			
Intake capacity	200			

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07-M/BA-STo42	Advanced Course Topolo	gy 3+1 (V)	From 5 <sup>th</sup> sem. onwards	9 CP
Module description	Advanced Course in Topology 3+1			
Module code	07-M/BA-STo31			
Faculty / subject / department	Faculty 07 / Mathematics / Depart	tment of Mathemati	cs	
Applies to degree courses / semesters	BSc Mathematics / from 5th seme	ester onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Analysis 1-3, basic id	deas of topology		
Course aims	Acquiring a more profound knowle	edge of topology – ir	ntermediate level	
Contents of module	Special fields of topology, e.g. alge analysis, etc	ebraic topology, diffe	erential topology, topological methods	of nonlinear
Forms of instruction	Lecture: 3 h per week, Tutorial: 1	h per week		
Total workload in hours	180	credit po	pints 6 CP	
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	45 h	15 h		
Ab preparation / follow- up	45 h	45 h		
B autonomous work in the module				
C examination	30 h preparation and examination	1		
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	irregular 1 semester			
Intake capacity	200			

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07-M/BA-ALG42	Advanced Module: Alg	gebraic Geometry 4+2 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Algebraic Geometry 4+2			
Module code	07-M/BA-ALG 42			
Faculty / subject / department	Faculty 07 / Mathematics / De	partment of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th se	emester onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I	+II and Algebra		
Course aims	To realize the relation betwee Providing fundamentals for stu	n algebraic concepts and methods o udies of algebraic groups	f complex analysis.	
Contents of module		alisation , Hilbert's Nullstellensatz Igebraic geometry, of algebraic curv	es or algebraic groups	
Forms of instruction	Lecture: 4 h per week, Tutori	al: 2 h per week		
Total workload in hours	270	credit points 9 CP		
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours Ab preparation / follow-	60 h	30 h		
up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examina	tion		
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advance 1 semester	d module in algebra offered every y	ear	
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-ALG31	Advanced Module: A	lgebraic Geometry 3+1 (V)	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Algebraic Geometry 3+1			
Module code	07-M/BA-ALG 31			
Faculty / subject / department	Faculty 07 / Mathematics / D	Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th	semester onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra	I+II and Algebra		
Course aims	To realize the relation betwe Providing fundamentals for s	en algebraic concepts and methods o studies of algebraic groups	f complex analysis.	
Contents of module		malisation, Hilbert's Nullstellensatz algebraic geometry, of algebraic curve	es or algebraic groups	
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week		
Total workload in hours	180	credit points 6 CP		
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	45 h	15 h		
Ab preparation / follow- up	45 h	45 h		
B autonomous work in the module				
C examination	30 h preparation and examir	nation		
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advand 1 semester	ced module in algebra offered every y	ear	
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-ALA42	Advanced Module Al	gebra: Algorithmi	ic Algebra 4+2 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Algebraic Geometry 4+2				
Module code	07-M/BA-ALA 42				
Faculty / subject / department	Faculty 07 / Mathematics / D	Department of Mathema	atics		
Applies to degree courses / semesters	BSc Mathematics / from 4th	semester onwards			
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Linear Algebra	I +II and Algebra			
Course aims	<ul> <li>Basic knowledge o</li> <li>Be familiar with th</li> </ul>	f lecture contents e basics of algorithmic t	hinking		
Contents of module	Deepening contents of math determination of t he (simpli presentations from their pro understood stabilizers, conc	icial) homology of speci operly discontinuous act	ific simplicial complexes, of tion on simply connected t	computation of group topological spaces wit	
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week			
Total workload in hours	270	credit	points 9 CP		
consisting of: A courses					
Aa contact hours	Lecture 60 h	Tutorial 30 h			
Ab preparation / follow- up	60 h	90 h			
B autonomous work in the module					
C examination	30 h preparation and examir	nation			
Module-component examinations	Oral or written exam				
Frequency,	Irregular, at least one advan	ced module in algebra o	offered every year		
duration in semesters	1 semester				
Intake capacity	200				
Language of instruction	German/English				

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07-M/BA-ALA31	Advanced Module A	lgebra: Algorithmic A	lgebra 3+1 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Algebraic Geometry 4+2				
Module code	07-M/BA-ALA 42				
Faculty / subject / department	Faculty 07 / Mathematics / I	Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / from 4th	semester onwards			
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Linear Algebra	a I+II and Algebra			
Course aims	<ul> <li>Basic knowledge c</li> <li>Be familiar with th</li> </ul>	f lecture contents le basics of algorithmic think	ng		
Contents of module	Deepening contents of math determination of t he (simpl presentations from their pr understood stabilizers, cond	icial) homology of specific s operly discontinuous action	mplicial complexes, on simply connected	computation of group topological spaces wi	
Forms of instruction	Lecture: 3 h per week, Tuto	orial: 1 h per week			
Total workload in hours	180	credit poir	ts 6 CP		
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	45 h	15 h			
Ab preparation / follow- up	45 h	45 h			
B autonomous work in the module					
C examination	30 h preparation and exami	nation			
Module-component examinations	Oral or written exam				
Frequency, duration in semesters	Irregular, at least one advan 1 semester	ced module in algebra offere	ed every year		
Intake capacity	200				
Language of instruction	German/English				

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07-M/BA-ALALB	Reading Course: Algorithmic Algebra	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Reading Course: Algorithmic Algebra		
Module code	07-M/BA-ALA 42		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematic	CS	
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards		
Module coordinator	Cf. German version		
Prerequisites for participation	Knowledge of Linear Algebra I+II and Algebra		
Course aims	<ul> <li>Be able to autonomously study literature</li> <li>Be able to complete outlined proofs</li> <li>Be able to analyse a counterexample</li> <li>Present and explain the texts read</li> </ul>		
Contents of module	Deepening contents of mathematics in the area of algorish determination of t he (simplicial) homology of specific presentations from their properly discontinuous actio understood stabilizers, concrete computations with (	simplicial complexes, computation of g	group es with well-
Forms of instruction	Seminar: 2 h per week		
Total workload in hours	180 credit po	vints 6 CP	
consisting of:			
A courses	Seminar		
Aa contact hours	30 h		
Ab preparation / follow- up	60 h		
~P			
B autonomous work in the module	75 h studies of literature		
B autonomous work in	75 h studies of literature 15 h exam preparation		
B autonomous work in the module		ng course	
B autonomous work in the module C examination Module-component	15 h exam preparation	ng course	
B autonomous work in the module C examination Module-component examinations	15 h exam preparation Oral or written exam or presentations during the readi	ng course	
B autonomous work in the module C examination Module-component examinations Frequency,	15 h exam preparation Oral or written exam or presentations during the reading Irregular	ng course	

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07-M/BA-GRM42	Advanced Module Algebra: Gro modules 4+2 (V)	ups, Rings,	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Groups, Rings, Modules 4+2			
Module code	07-M/BA-GRM42			
1 <sup>st</sup> semester of this module / version number	Summer semester 2012 V1			
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onw	ards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I+II and Algeb	ora		
Course aims	<ul> <li>Basic knowledge of lecture conte</li> <li>Provide fundamentals for the stugroups, algebraic K-theory</li> </ul>		, commutative algebras, performan	ce of
Contents of module	Semisimple modules, chain condition. Deepened mathematical contents of group group theory, commutative algebra, homo algebra/geometry.			
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per we	eek		
Total workload in hours	270	credit points	) CP	
consisting of: A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	Irregular, at least one advanced module in	algebra offered ev	ery year	
	1 semester			
duration in semesters				
duration in semesters Intake capacity	200			

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07-M/BA-GRM31	Advanced Module Algebra: modules 3+1 (V)	Groups, Rings,	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Groups, Rings, Modules 4+2			
Module code	07-M/BA-GRM31			
Faculty / subject / department	Faculty 07 / Mathematics / Departme	nt of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester	r onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I+II and	Algebra		
Course aims	<ul> <li>Basic knowledge of lecture</li> <li>Provide fundamentals for t groups, algebraic K-theory</li> </ul>		s, commutative algebras, performanc	e of
Contents of module	Semisimple modules, chain condition Deepened mathematical contents of group theory, commutative algebra, h algebra/geometry	group, rings and/or mod		-
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h p	er week		
Total workload in hours	180	credit points	6 CP	
consisting of: A courses	Lecture	Tutorial		
Aa contact hours	45 h	15 h		
Ab preparation / follow- up	45 h	45 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advanced modulation 1 semester	Ile in algebra offered ev	/ery year	
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-GRMLB	Reading Course: Groups, Rings and Modules	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Reading Course: Groups, rings and modules		
Module code	07-M/BA-GRMLB		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards		
Module coordinator	Cf. German version		
Prerequisites for participation	Knowledge of Linear Algebra I+II and Algebra		
Course aims	<ul> <li>Basic knowledge of lecture contents</li> <li>Provide fundamentals for the study of Lie-algebras, groups, algebraic K-theory</li> </ul>	commutative algebras, performance	e of
Contents of module	Semisimple modules, chain condition. Deepened mathematical contents of group, rings and/or mod group theory, commutative algebra, homological algebra, clas algebra/geometry		
Forms of instruction	Lecture: 2 h per week		
Total workload in hours	180 credit points 6	СР	
Total workload in hours consisting of:	180 credit points 6	СР	
	180 credit points 6 Seminar	СР	
consisting of:		СР	
consisting of: A courses	Seminar	СР	
consisting of: A courses Aa contact hours Ab preparation / follow-	Seminar 30 h	СР	
consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in	Seminar 30 h 60 h	СР	
consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module	Seminar 30 h 60 h 75 h studies of literature		
consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination Module-component	Seminar 30 h 60 h 75 h studies of literature 15 h exam preparation		
consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination Module-component examinations Frequency,	Seminar 30 h 60 h 75 h studies of literature 15 h exam preparation Oral or written exam or presentations during the reading cou Irregular		

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07-М/ВА-КоF42	Advanced Module Algebra	: Complex Functions 4+2 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Complex Functions 4+2			
Module code	07-M/Ba-KoF42			
Faculty / subject / department	Faculty 07 / Mathematics / Departm	ent of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semeste	er onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I+II and	Algebra		
Course aims	Usage of methods of algeb	<ul> <li>Basic knowledge of lecture contents</li> <li>Usage of methods of algebra, geometry, topology and analysis</li> <li>Knowledge of a deeper connection between the above named areas of abstract mathematics</li> </ul>		
Contents of module	such as studying meromorphic fun- meromorphic functions of a specific context, properties of modular grou coverings, monodromy groups, We	om an area of the theory of functions o ctions on the Riemann sphere, determ c compact Riemannian surface, theore p and Fuchsian groups, Riemannian su ierstraß product theorem, domain as quotient field of the ring o	ination of the field of m of Riemann-Roch in rface of an algebraic fi	
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h	per week		
Total workload in hours	270	credit points 9 CP		
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advanced moc 1 semester	lule in algebra offered every year		
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-KoF31	Advanced Module Algebra:	Complex Functions 3+1 (V)	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Complex Functions 4+2			
Module code	07-M/Ba-KoF31			
Faculty / subject / department	Faculty 07 / Mathematics / Department	nt of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester	onwards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I+II and A	Algebra		
Course aims	Usage of methods of algebra	Usage of methods of algebra, geometry, topology and analysis		
Contents of module	Advanced mathematical contents from such as studying meromorphic funct meromorphic functions of a specific context, properties of modular group coverings, monodromy groups, Weie field of meromorphic functions of a content functions of that domain	ions on the Riemann sphere, determ compact Riemannian surface, theore and Fuchsian groups, Riemannian su rstraß product theorem,	ination of the field of m of Riemann-Roch in ırface of an algebraic fi	
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h p	er week		
Total workload in hours	180	credit points 6 CP		
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	45 h	15 h		
Ab preparation / follow- up	45h	45 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advanced modu 1 semester	le in algebra offered every year		
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-KoFLB	Reading Course: Complex Functions	From 4 <sup>th</sup> sem. onwards	6 CP			
Module description	Reading Course: Complex Functions					
Module code	07-M/Ba-KoFLB					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathema	ics				
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards					
Module coordinator	Cf. German version	. German version				
Prerequisites for participation	nowledge of Linear Algebra I+II and Algebra					
Course aims	<ul> <li>Be able to autonomously study literature</li> <li>Be able to complete outlined proofs</li> <li>Be able to analyse a counterexample</li> <li>Present and explain the texts read</li> </ul>					
Contents of module	Advanced mathematical contents from an area of the such as studying meromorphic functions on the Rie meromorphic functions of a specific compact Riema context, properties of modular group and Fuchsian g coverings, monodromy groups, Weierstraß product field of meromorphic functions of a domain as quot functions of that domain	mann sphere, determination of the field o nnian surface, theorem of Riemann-Roch roups, Riemannian surface of an algebraic theorem,	of in this			
Forms of instruction	Seminar: 2 h per week					
Total workload in hours	180 credit r	points 6 CP				
consisting of:						
A courses	Seminar					
Aa contact hours	30 h					
Ab preparation / follow- up	60 h					
B autonomous work in the module	75 h studies of literature					
C examination	15 h exam preparation					
Module-component examinations	Oral or written exam or presentations during the rea	ding course				
Frequency,	Irregular					
duration in semesters	1 semester					
Intake capacity	15					
Language of instruction	German					

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07-M/BA-ZT42	Advanced Module Algebra: Number Theory 4+2 (V)		From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Number Theory 4+2			
Module code	07-M/Ba-ZT42			
Faculty / subject / department	Faculty 07 / Mathematics / Department of I	Mathematics (1997)		
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwa	ards		
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge of Linear Algebra I+II and Algebr	а		
Course aims	<ul> <li>Basic knowledge of number theor</li> <li>Usage of algebraic methods in an</li> </ul>	-		
Contents of module	Chinese remainder theorem, quadratic recip Advanced results of algebraic, algorithmic o For example: quadratic number rings, prim	or analytical number theory	distribution	
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per we	ek		
Total workload in hours	270	credit points 9 CP		
consisting of: A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency, duration in semesters	Irregular, at least one advanced module in algebra offered every year 1 semester			
Intake capacity	200			
Language of instruction	German/English			

Special Regulation for the Bachelor Degree Programme Mathematics	7.35.07 No. 3
Attachment 2: Module Descriptions	
Version 7 of February 12, 2012	

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

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07-M/BA-ZT42	Advanced Module Al	gebra: Number Theory 4	l+2 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Number Theory 4+2				
Module code	07-M/Ba-ZT42				
Faculty / subject / department	Faculty 07 / Mathematics / I	Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / from 4th	semester onwards			
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Linear Algebra	I+II and Algebra			
Course aims	<ul> <li>Basic knowledge o</li> <li>Usage of algebraic</li> </ul>	f number theory methods in an allied mathematic	field		
Contents of module	_	, quadratic reciprocity c, algorithmic or analytical numb Iber rings, primality tests or prim	-	stribution	
Forms of instruction	Lecture: 4 h per week, Tuto	rial: 2 h per week			
Total workload in hours	270	credit points	CP		
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	60 h	30 h			
Ab preparation / follow- up	60 h	90 h			
B autonomous work in the module					
C examination	30 h preparation and examin	nation			
Module-component examinations	Oral or written exam				
Frequency, duration in semesters	Irregular, at least one advan 1 semester	ced module in algebra offered ev	ery year		
Intake capacity	200				
Language of instruction	German/English				

Special Regulation for the Bachelor Degree Programme Mathematics	7.35.07 No. 3
Attachment 2: Module Descriptions	
Version 7 of February 12, 2012	

Version 7 of February 13, 2013

Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

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07-M/BA-ZT31	Advanced Module Alg	ebra: Number Theory	/ 4+2 (V)	From 4 <sup>th</sup> sem. onwards	9 CP
Module description	Number Theory 4+2				
Module code	07-M/Ba-ZT42				
Faculty / subject / department	Faculty 07 / Mathematics / De	partment of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / from 4th se	emester onwards			
Module coordinator	Cf. German version				
Prerequisites for participation	Knowledge of Linear Algebra I	+II and Algebra			
Course aims	<ul> <li>Basic knowledge of i</li> <li>Usage of algebraic n</li> </ul>	number theory nethods in an allied mathema	atic field		
Contents of module	Chinese remainder theorem, of Advanced results of algebraic, For example: quadratic numb	algorithmic or analytical nur		stribution	
Forms of instruction	Lecture: 4 h per week, Tutori	al: 2 h per week			
Total workload in hours	180	credit points	6 CP		
consisting of:					
A courses	Lecture	Tutorial			
Aa contact hours	45 h	15 h			
Ab preparation / follow- up	45 h	45 h			
B autonomous work in the module					
C examination	30 h preparation and examina	tion			
Module-component examinations	Oral or written exam				
Frequency, duration in semesters	Irregular, at least one advance 1 semester	d module in algebra offered	every year		
Intake capacity	200				
Language of instruction	German/English				

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07-M/BA-SDM42	Advanced Course in Discrete Ma	thematics 4+2	From 5 <sup>th</sup> sem. onwards	9 CP
Module description	Advanced Course in Discrete Mathematics 4	+2		
Module code	07-M/Ba-SDM42			
Faculty / subject / department	Faculty 07 / Mathematics / Department of N	1athematics		
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwa	rds		
Module coordinator	Cf. German version			
Prerequisites for participation	Discrete Mathematics			
Course aims	Acquiring a more profound knowledge of an	area of discrete mathe	ematics	
Contents of module	Selected fields of discrete mathematics-counting methods-algebraic combinatorics-network theory-graph theory-distance-regular graphs-coding theory-Block designs and config	urations		
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per wee	ek		
Total workload in hours	270	credit points 9 CP		
consisting of: A courses	Lecture	Tutorial		
Aa contact hours	60 h	30 h		
Ab preparation / follow- Up	60 h	90 h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	Irregular			
duration in semesters	1 semester			
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-SDM31	Advanced Course in Discrete Math	ematics 3+1 (V)	From 5 <sup>th</sup> sem. onwards	6 CP
Module description	Advanced Course in Discrete Mathematics 3+1			
Module code	07-M/Ba-ZT31			
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	thematics		
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onward	5		
Module coordinator	Cf. German version			
Prerequisites for participation	Discrete Mathematics			
Course aims	Acquiring a more profound knowledge of an a	rea of discrete mathem	atics	
Contents of module	Selected fields of discrete mathematics - counting methods - algebraic combinatorics - network theory - graph theory - distance-regular graphs - coding theory - Block designs and configurations			
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h per week			
Total workload in hours	180	credit points 6 CP		
consisting of:				
A courses	Lecture Tu	itorial		
Aa contact hours	45 h 15	i h		
Ab preparation / follow- up	60 h 30	) h		
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	Irregular			
duration in semesters	1 semester			
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-SDM22	Advanced Course in Discrete Ma	thematics 2+2	From 5 <sup>th</sup> sem. onwards	6 CP
Module description	Advanced Course in Discrete Mathematics 2	+2		
Module code	07-M/Ba-SDM22			
Faculty / subject / department	Faculty 07 / Mathematics / Department of N	lathematics		
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwa	rds		
Module coordinator	Cf. German version			
Prerequisites for participation	Discrete Mathematics			
Course aims	Acquiring a more profound knowledge of ar	area of discrete mathe	ematics	
Contents of module	Selected fields of discrete mathematics - counting methods - algebraic combinatorics - network theory - graph theory - distance-regular graphs - coding theory - Block designs and configurations			
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h per wee	k		
Total workload in hours	180	credit points 6 CP		
consisting of:				
A courses	Lecture	Tutorial		
Aa contact hours	30 h	30 h		
Ab preparation / follow- up	45 h	60 h		
B autonomous work in the module				
C examination	15 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	Irregular			
duration in semesters	1 semester			
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-SDM20	Advanced Course in Discrete Math	ematics 2+0 (V)	From 5 <sup>th</sup> sem. onwards	3 CP
Module description	Number Theory 4+2			
Module code	07-M/Ba-SDM20	'-M/Ba-SDM20		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	thematics		
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onward	5		
Module coordinator	Cf. German version			
Prerequisites for participation	Discrete Mathematics	Jiscrete Mathematics		
Course aims	Acquiring a more profound knowledge of an a	rea of discrete mathem	natics	
Contents of module	Selected fields of discrete mathematics - counting methods - algebraic combinatorics - network theory - graph theory - distance-regular graphs - coding theory - Block designs and configurations			
Forms of instruction	Lecture: 2 h per week			
Total workload in hours	90	credit points 3 CP		
consisting of:				
A courses	Lecture Tu	itorial		
Aa contact hours	30 h			
Ab preparation / follow- up	30 h			
B autonomous work in the module				
C examination	30 h preparation and examination			
Module-component examinations	Oral or written exam			
Frequency,	Irregular			
duration in semesters	1 semester			
Intake capacity	200			
Language of instruction	German/English			

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07-M/BA-SGe42	Advanced Course in Geometry 4-	+2 (V)	From 5 <sup>th</sup> sem. onwards	9 CP			
Module description	Advanced Course in Geometry 4+2						
Module code	07-M/Ba-SGe42						
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	lathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwar	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version	Cf. German version					
Prerequisites for participation	Geometry	Geometry					
Course aims	Acquiring a more profound knowledge of ar	area of geor	netry				
Contents of module	Selected fields of geometry - incidence geometry - finite geometry - projective spaces und po - metric geometry - algebraic geometry	lar spaces					
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per wee	k					
Total workload in hours	270	credit point	s 9 CP				
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	60 h	30 h					
Ab preparation / follow- Up	60 h	90 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SGe31	Advanced Course in Geometry	3+1 (V)	From 5 <sup>th</sup> sem. onwards	9 CP			
Module description	Advanced Course in Geometry 3+1						
Module code	07-M/Ba-SGe31						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	f Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onv	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Geometry						
Course aims	Acquiring a more profound knowledge of an area of geometry						
Contents of module	Selected fields of geometry - incidence geometry - finite geometry - projective spaces und polar spaces - metric geometry - algebraic geometry - algebraic geometry						
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h per w	veek					
Total workload in hours	180	credit points	6 CP				
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	45 h	15 h					
Ab preparation / follow- up	60 h	30 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency,	Irregular						
duration in semesters	1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SGe22	Advanced Course in Geometry 2+	2 (V)	From 5 <sup>th</sup> sem. onwards	9 CP			
Module description	Advanced Course in Geometry 2+2						
Module code	07-M/Ba-SGe22						
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	athemat	ics				
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwar	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Geometry	Geometry					
Course aims	Acquiring a more profound knowledge of an area of geometry						
Contents of module	Selected fields of geometry - incidence geometry - finite geometry - projective spaces und polar spaces - metric geometry - algebraic geometry - selected fields of geometry - algebraic geometry - selected fields of g						
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h per wee	(					
Total workload in hours	180	credit p	oints 6 CP				
consisting of:							
A courses	Lecture 1	utorial					
Aa contact hours	30 h 3	0 h					
Ab preparation / follow- up	45 h 6	0 h					
B autonomous work in the module							
C examination	15 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency,	Irregular						
duration in semesters	1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SGe20	Advanced Course in Geometry 2+	0 (V)	From 5 <sup>th</sup> sem. onwards	3 CP			
Module description	Advanced Course in Geometry 2+0						
Module code	07-M/Ba-SGe20						
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	athemat	ics				
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onward	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Geometry						
Course aims	Acquiring a more profound knowledge of an area of geometry						
Contents of module	Selected fields of geometry - incidence geometry - finite geometry - projective spaces und polar spaces - metric geometry - algebraic geometry - algebraic geometry - Selected fields of g						
Forms of instruction	Lecture: 2 h per week						
Total workload in hours	90	credit p	oints 3 CP				
consisting of:							
A courses	Lecture T	utorial					
Aa contact hours	30 h						
Ab preparation / follow- up	30 h						
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency,	Irregular						
duration in semesters	1 semester						
Intake capacity	200						
Language of instruction	German/English						

07-M/BA-SNu42	Advanced Lecture Course in Num	From 5 <sup>th</sup> sem. onwards	9 CP				
Module description	Advanced Lecture Course in Numerical Analy	/sis 4+2					
Module code	07-M/Ba-SNu42						
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics						
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwa	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in the respective field of Numerio	CS					
Course aims	Acquiring a more profound knowledge of ar	area in Numerics					
Contents of module	Selected fields as per notice						
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per wee	:k					
Total workload in hours	270	credit points 9 CP					
consisting of: A courses	Lecture	Tutorial					
Aa contact hours		30 h					
Ab preparation / follow- up	60 h	90 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

07-M/BA-SNu31	Advanced Lecture Course in N 3+1 (V)	From 5 <sup>th</sup> sem. onwards	6 CP				
Module description	Advanced Lecture Course in Numerical A	nalysis 3+1					
Module code	07-M/Ba-SNu31						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester on	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in the respective field of Num	nerics					
Course aims	Acquiring a more profound knowledge of an area in Numerics						
Contents of module	Selected fields as per notice						
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h per	week					
Total workload in hours	180	credit points 6 CP					
consisting of: A courses	Lecture	Tutorial					
Aa contact hours	45 h	15 h					
Ab preparation / follow- up	45 h	45 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

07-M/BA-SNu22	Advanced Lecture Cours 2+2 (V)	From 5 <sup>th</sup> sem. onwards	6 CP				
Module description	Advanced Lecture Course in Num	nerical Analysis 2+2					
Module code	07-M/Ba-SNu22	7-M/Ba-SNu22					
Faculty / subject / department	Faculty 07 / Mathematics / Depa	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th sem	3Sc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in the respective field	d of Numerics					
Course aims	Acquiring a more profound knowledge of an area in Numerics						
Contents of module	Selected fields as per notice						
Forms of instruction	Lecture: 4 h per week, Tutorial:	2 h per week					
Total workload in hours	180	credit points 6 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	30 h	30 h					
Ab preparation / follow- up	45 h	60 h					
B autonomous work in the module							
C examination	15 h preparation and examinatio	n					
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SNu20	Advanced Lecture Course in Nume 2+0 (V)	From 5 <sup>th</sup> sem. onwards	6 CP				
Module description	Advanced Lecture Course in Numerical Analysis	5 2+0					
Module code	07-M/Ba-SNu22	- 7-M/Ba-SNu22					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mat	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards						
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in the respective field of Numerics						
Course aims	Acquiring a more profound knowledge of an area in Numerics						
Contents of module	Selected fields as per notice						
Forms of instruction	Lecture: 4 h per week						
Total workload in hours	90 c	redit points 3 CP					
consisting of: A courses	Lecture						
Aa contact hours	30 h						
Ab preparation / follow- up	30 h						
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam	_					
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SSt42	Advanced Course in Probability	From 5 <sup>th</sup> sem. onwards	9 CP			
Module description	Advanced Course in Probability and Statist	ics 4+2				
Module code	07-M/Ba-SSt42					
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Mathematics				
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge in Analysis 1 + 2, Linear Algebra	a 1+ 2, Probability and Statistics	51+2			
Course aims	Acquiring a more profound knowledge of successfully work on his/her bachelor thes		stics which enables the	student to		
Contents of module	Selected areas of probability and statistics generalised linear models non-parametric statistics Markov chains discrete financial mathematics ergodic theory martingale theory game theory elementary risk theory					
Forms of instruction	Lecture: 4 h per week, Tutorial: 2 h per w	eek				
Total workload in hours	270	credit points 9 CP				
consisting of:						
A courses	Lecture	Tutorial				
Aa contact hours	60 h	30 h				
Ab preparation / follow- up	60 h	90 h				
B autonomous work in the module						
C examination	30 h preparation and examination					
Module-component examinations	Oral or written exam					
Frequency, duration in semesters	Irregular 1 semester					
Intake capacity	200					
Language of instruction	German/English					

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07-M/BA-SSt31	Advanced Course in Probability	From 5 <sup>th</sup> sem. onwards	9 CP				
Module description	Advanced Course in Probability and Statisti	ics 4+2					
Module code	07-M/Ba-SSt31						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards						
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in Analysis 1 + 2, Linear Algebra	a 1+ 2, Probability and Statistics	51+2				
Course aims		Acquiring a more profound knowledge of an area of probability and Statistics which enables the student to successfully work on his/her bachelor thesis					
Contents of module	Selected areas of probability and statistics generalised linear models non-parametric statistics Markov chains discrete financial mathematics ergodic theory martingale theory game theory elementary risk theory						
Forms of instruction	Lecture: 3 h per week, Tutorial: 1 h per we	eek					
Total workload in hours	180	credit points 6 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	45 h	15 h					
Ab preparation / follow- up	60 h	30 h					
B autonomous work in the module							
C examination	30 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

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07-M/BA-SSt22	Advanced Course in Probability	From 5 <sup>th</sup> sem. onwards	9 CP				
Module description	Advanced Course in Probability and Statist	cics 4+2					
Module code	07-M/Ba-SSt42						
Faculty / subject / department	Faculty 07 / Mathematics / Department of	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards						
Module coordinator	Cf. German version						
Prerequisites for participation	Knowledge in Analysis 1 + 2, Linear Algebr	a 1+ 2, Probability and Statistics	1 + 2				
Course aims		Acquiring a more profound knowledge of an area of probability and Statistics which enables the student to successfully work on his/her bachelor thesis					
Contents of module	Selected areas of probability and statistics generalised linear models non-parametric statistics Markov chains discrete financial mathematics ergodic theory martingale theory game theory elementary risk theory						
Forms of instruction	Lecture: 2 h per week, Tutorial: 2 h per w	eek					
Total workload in hours	180	credit points 6 CP					
consisting of:							
A courses	Lecture	Tutorial					
Aa contact hours	30 h	30 h					
Ab preparation / follow- up	45 h	60 h					
B autonomous work in the module							
C examination	15 h preparation and examination						
Module-component examinations	Oral or written exam						
Frequency, duration in semesters	Irregular 1 semester						
Intake capacity	200						
Language of instruction	German/English						

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.	
rease note that only the deman version of the modules is official and regary binding. The English version is for informative purposes only.	

07-M/BA-SSt20	Advanced Course in Probability	and Statistics 2+0 (V)	From 5 <sup>th</sup> sem. onwards	3 CP		
Module description	Advanced Course in Probability and Statistic	cs 4+2				
Module code	07-M/Ba-SSt42					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards					
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge in Analysis 1 + 2, Linear Algebra 1+ 2, Probability and Statistics 1 + 2					
Course aims	Acquiring a more profound knowledge of an area of probability and Statistics which enables the student to successfully work on his/her bachelor thesis					
Contents of module	Selected areas of probability and statistics         generalised linear models         non-parametric statistics         Markov chains         discrete financial mathematics         ergodic theory         martingale theory         game theory         elementary risk theory					
Forms of instruction	Lecture: 2h per week					
Total workload in hours	90	credit points 3 CP				
consisting of:						
A courses	Lecture					
Aa contact hours	30 h					
Ab preparation / follow- up	30 h					
B autonomous work in the module						
C examination	30 h preparation and examination					
Module-component examinations	Oral or written exam					
Frequency, duration in semesters	Irregular 1 semester					
Intake capacity	200					
Language of instruction	German/English					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-Pro	Proseminar (V)	From 2 <sup>nd</sup> sem. onwards	6 CP		
Module description	Proseminar				
Module code	07-M/Ba-Pro				
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / from 2nd semester onwards				
Module coordinator	Cf. German version				
Prerequisites for participation	Depending on mathematical focus; at least knowledge of Analysis 1 and Linear Algebra 1				
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them</li> <li>to present understandebly and accurately their content in front of an audience.</li> </ul>				
Contents of module	Scientific texts about various topics or a group of topics. The texts are appropriate for the level of the 2nd semester and complement/extend the contents of the fundamental lectures.				
Forms of instruction	Proseminar: 2 h per week				
Total workload in hours	180 cre	dit points 6 CP			
consisting of: A courses	Proseminar 30 h				
Aa contact hours Ab preparation / follow- up	60 h				
B autonomous work in the module	90 h preparation of presentation				
C examination					
	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "passed"				
Module-component examinations		assed"			
Module-component examinations Frequency, duration in semesters		assed"			
examinations Frequency,	This module is ungraded – it will be marked as "p At least every summer semester,	assed"			

Advice on module: see semester notice Date: see course catalogue Reading list: see semester notice

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

07-M/BA-SemAn	Seminar Analysis (S)	5 <sup>th</sup> or 6 <sup>th</sup>	sem.	6 CP		
Module description	Seminar in Analysis					
Module code	07-M/Ba-SemAn					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics					
Applies to degree courses / semesters	BSc Mathematics / 5th or 6th semester					
Module coordinator	Cf. German version					
Prerequisites for participation	Knowledge in Analysis 1 -3					
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them</li> <li>to present coherently and accurately their content in front of an audience.</li> <li>Furthermore, in seminars, an introduction to the field of the subsequent thesis can take place.</li> </ul>					
Contents of module	Scientific texts about various topics or a group of topics. The level of the texts is advanced and can reach up to current research.					
Forms of instruction	Seminar : 2 h per week					
Total workload in hours	180 cre	edit points 6 CP				
consisting of: A courses	Seminar					
Aa contact hours	30 h					
Ab preparation / follow- up	60 h					
B autonomous work in the module	90 h preparation of presentation					
C examination						
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "passed"					
Frequency,	At least every summer semester, 1 semester					
duration in semesters	1 semester					
duration in semesters Intake capacity	1 semester 15					

Advice on module: see semester notice Date: see course catalogue Reading list: see semester notice

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07-M/BA-SemTo	Seminar Topology (V)	5 <sup>th</sup> or	<sup>6<sup>th</sup> sem.</sup>	6 CP
Module description	Seminar in Topology			
Module code	07-M/Ba-SemTo			
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	athematics		
Applies to degree courses / semesters	BSc Mathematics / 5th or 6th semester			
Module coordinator	Cf. German version			
Prerequisites for participation	Knowledge in Analysis 1 -3 , basic terms of to	pology		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific text</li> <li>to discover shortcomings (lack of evidend</li> <li>to present coherently and accurately the Furthermore, in seminars, an introduction to</li> </ul>	e, etc.) and, preferably, to corre r content in front of an audienc	ce.	lace.
Contents of module	Scientific texts about various topics of topolo The level of the texts is advanced and can rea			
Forms of instruction				
	Seminar : 2 h per week			
Total workload in hours	Seminar : 2 h per week 180	credit points 6 CP		
Total workload in hours		credit points 6 CP		
Total workload in hours consisting of:	180	credit points 6 CP		
Total workload in hours consisting of: A courses	180 Seminar	credit points 6 CP		
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow-	180 Seminar 30 h	credit points 6 CP		
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in	180           Seminar           30 h           60 h	credit points 6 CP		
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module	180           Seminar           30 h           60 h			
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination Module-component	180         Seminar         30 h         60 h         90 h preparation of presentation         Form: presentation and poss. elaboration			
Total workload in hours consisting of: A courses Aa contact hours Ab preparation / follow- up B autonomous work in the module C examination Module-component examinations Frequency,	180         Seminar         30 h         60 h         90 h preparation of presentation         Form: presentation and poss. elaboration         This module is ungraded – it will be marked at At least every summer semester,			

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07-M/BA-SemZt	Number Theory (V)	5 <sup>th</sup> or 6 <sup>th</sup> sem.	6 CP
Module description	Seminar on Number Theory		
Module code	07-M/Ba-SemZt		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / 5th or 6th semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Lecture in Number Theory		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.) and, present coherently and accurately their content in froc Furthermore, in seminars, an introduction to the field of the</li> </ul>	ont of an audience.	place.
Contents of module	Scientific texts about various topics or a group of topics. The level of the texts is advanced and can reach up to current	nt research.	
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 credit points	6 CP	
consisting of: A courses	Seminar 30 h		
Aa contact hours Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "passed"		
Frequency, duration in semesters	Irregular. Following a lecture on number theory 1 semester		
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemAG	Seminar Algebraic Geometry (V)		5 <sup>th</sup> or 6 <sup>th</sup> sem.	6 CP
Module description	Seminar on Algebraic Geometry			
Module code	07-M/Ba-SemAG			
Faculty / subject / department	Faculty 07 / Mathematics / Department of N	lathematics		
Applies to degree courses / semesters	BSc Mathematics / 5th or 6th semester			
Module coordinator	Cf. German version			
Prerequisites for participation	Lecture on algebraic geometry			
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific tex</li> <li>to discover shortcomings (lack of eviden</li> <li>to present coherently and accurately the</li> <li>Furthermore, in seminars, an introduction to</li> </ul>	ce, etc.) and, preferably, ir content in front of an	audience.	lace.
Contents of module	Scientific texts about various topics or a grou The level of the texts is advanced and can re		ch.	
Forms of instruction	Seminar : 2 h per week			
Total workload in hours	180	credit points 6 CP		
consisting of: A courses	Seminar 30 h			
Aa contact hours Ab preparation / follow- up	60 h			
B autonomous work in the module	90 h preparation of presentation			
C examination				
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked	as "passed"		
Frequency, duration in semesters	Irregular. Following a lecture on algebraic ge 1 semester	ometry		
Intake capacity	15			
Language of instruction	German			

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07-M/BA-SemKoF	Seminar on Complex Functions (	/) From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Seminar on Complex Functions		
Module code	07-M/Ba-SemKoF		
Faculty / subject / department	Faculty 07 / Mathematics / Department of M	athematics	
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester onward	ls	
Module coordinator	Cf. German version		
Prerequisites for participation	Linear Algebra I, II, Algebra, Analysis I, II, III, L	ecture Complex Functions	
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific text</li> <li>to discover shortcomings (lack of evidence)</li> <li>to present coherently and accurately the Furthermore, in seminars, an introduction to</li> </ul>	e, etc.) and, preferably, to correct them	
Contents of module	such as studying meromorphic functions or meromorphic functions of a specific compare	as quotient field of the ring of holomorphic	
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180	credit points 6 CP	
consisting of: A courses	Seminar		
Aa contact hours	30 h		
Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. Elaboration This module is ungraded – it will be marked a	s "passed"	
Frequency, duration in semesters	Irregular. Following a lecture on complex fun 1 semester	ctions	
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemAlA	Seminar on Algorithmic Algebra (V)	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Seminar on Algorithmic Algebra		
Module code	07-M/Ba-SemKoF		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathema	tics	
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester onwards		
Module coordinator	Cf. German version		
Prerequisites for participation	Linear Algebra I, II, Algebra		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.)</li> <li>to present coherently and accurately their conter</li> <li>Furthermore, in seminars, an introduction to the field</li> </ul>	nt in front of an audience. d of the subsequent thesis can take place.	
Contents of module	Scientific texts from an area of algorithmic algebra s determination of t he (simplicial) homology of speci presentations from their properly discontinuous act understood stabilizers, concrete computations with The level of the texts is advanced and can reach up t	fic simplicial complexes, computation of g ion on simply connected topological space (possibly non-commutative) Gröbner base	es with well-
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 credit	points 6 CP	
consisting of: A courses Aa contact hours	Seminar 30 h		
Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "pass	ed"	
Frequency, duration in semesters	Irregular. Following a lecture on algorithmic algebra 1 semester		
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemGRM	Seminar on Groups, Rings, Modules (V)	From 4 <sup>th</sup> sem. onwards	6 CP
Module description	Seminar on Groups, rings, Modules		
Module code	07-M/Ba-SemGRM		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathema	ics	
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester onwards		
Module coordinator	Cf. German version		
Prerequisites for participation	Linear Algebra I, II, Algebra, Lecture on Groups, Rings	and Modules	
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.)</li> <li>to present coherently and accurately their content</li> <li>Furthermore, in seminars, an introduction to the field</li> </ul>	t in front of an audience. I of the subsequent thesis can take place.	
Contents of module	Scientific texts about various topics or a group of the combinatorial or geometric group theory, commutat functions or non-commutative algebra/geometry The level of the texts is advanced and can reach up to	ve algebra, homological algebra, classic algeb	oraic K-
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 credit	points 6 CP	
consisting of: A courses	Seminar 30 h		
Aa contact hours Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "passe	d″	
Frequency, duration in semesters	Irregular. Following a lecture on groups, rings, modul 1 semester	es	
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemDM	Seminar in Discrete Mathematics	5 <sup>th</sup> or 6 <sup>th</sup> semester	6 CP
Module description	Seminar in Discrete Mathematics		
Module code	07-M/Ba-SemDM		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathe	ematics	
Applies to degree courses / semesters	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Discrete Mathematics		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, e</li> <li>to present coherently and accurately their co</li> <li>Furthermore, in seminars, an introduction to the</li> </ul>	ntent in front of an audience.	
Contents of module	Scientific texts about various topics or a group of The level of the texts is advanced and can reach u		
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 cre	dit points 6 CP	
consisting of: A courses Aa contact hours	Seminar 30 h		
Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "p	assed"	
Frequency, duration in semesters	Irregular. 1 semester		
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemGe	Seminar in Geometry	5 <sup>th</sup> or 6 <sup>th</sup> semester	6 CP
Module description	Seminar in Geometry		
Module code	07-M/Ba-SemGe		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	thematics	
Applies to degree courses / semesters	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Geometry		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence</li> <li>to present coherently and accurately their</li> <li>Furthermore, in seminars, an introduction to to</li> </ul>	content in front of an audience.	e place.
Contents of module	Scientific texts about various topics or a group The level of the texts is advanced and can read		
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180	credit points 6 CP	
consisting of: A courses	Seminar 30 h		
Aa contact hours Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as	"passed"	
Frequency, duration in semesters	Irregular. 1 semester		
Intake capacity	15		
Language of instruction	German		

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07-M/BA-SemNu	Seminar in Numerical Analysis	5 <sup>th</sup> or 6 <sup>th</sup> semester	6 CP		
Module description	Seminar in Geometry				
Module code	07-M/Ba-SemNu				
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathe	natics			
Applies to degree courses / semesters	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester			
Module coordinator	Cf. German version				
Prerequisites for participation	Depending on subject-related orientation				
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, etc.)</li> <li>to present coherently and accurately their con Furthermore, in seminars, an introduction to the f</li> </ul>	tent in front of an audience. ield of the subsequent thesis can tak	e place.		
Contents of module	Scientific texts about various topics or a group of t The level of the texts is advanced and can reach u				
Forms of instruction	Seminar : 2 h per week				
Total workload in hours	180 crec	it points 6 CP			
consisting of: A courses Aa contact hours	Seminar 30 h				
Ab preparation / follow- up	60 h				
B autonomous work in the module	90 h preparation of presentation				
C examination					
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "pa	ssed"			
Frequency, duration in semesters	At least every summer semester 1 semester				
Intake capacity	15				
Language of instruction	German				

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07-M/BA-SemSt	Seminar in Probability and Statistics	5 <sup>th</sup> or 6 <sup>th</sup> semester	6 CP
Module description	Seminar in Probability and Statisctics		
Module code	07-M/Ba-SemSt		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathe	matics	
Applies to degree courses / semesters	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Probability and Statistics 1 + 2		
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, et</li> <li>to present coherently and accurately their con</li> <li>Furthermore, in seminars, an introduction to the</li> </ul>	ntent in front of an audience. field of the subsequent thesis can take	e place.
Contents of module	Scientific texts about various topics or a group of The level of the texts is advanced and can reach u		
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 cre	dit points 6 CP	
consisting of: A courses	Seminar 30 h		
Aa contact hours Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "p.	assed"	
Frequency, duration in semesters	Irregular. 1 semester		
Intake capacity	15		
Language of instruction	German		

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7-M/BA-SemFi	Seminar in Finance	5 <sup>th</sup> or 6 <sup>th</sup> semester	6 CP
Module description	Seminar in Finance		
Module code	07-M/Ba-SemGe		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathe	ematics	
Applies to degree courses / semesters	BSc Mathematics / 5 <sup>th</sup> or 6 <sup>th</sup> semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Probability and Statistics 1+2, Financial Engineeri	ng	
Course aims	<ul> <li>The students should learn</li> <li>to become acquainted with scientific texts</li> <li>to discover shortcomings (lack of evidence, e</li> <li>to present coherently and accurately their co</li> <li>Furthermore, in seminars, an introduction to the</li> </ul>	ntent in front of an audience.	ke place.
Contents of module	Scientific texts about various topics or a group of The level of the texts is advanced and can reach u		
Forms of instruction	Seminar : 2 h per week		
Total workload in hours	180 cre	edit points 6 CP	
consisting of: A courses	Seminar 30 h		
Aa contact hours Ab preparation / follow- up	60 h		
B autonomous work in the module	90 h preparation of presentation		
C examination			
Module-component examinations	Form: presentation and poss. elaboration This module is ungraded – it will be marked as "p	bassed"	
Frequency,	Irregular. 1 semester		
duration in semesters	isemester		
duration in semesters Intake capacity	15		

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07-M/BA-Prakt	Practical Training	From 2 <sup>nd</sup> sem. onwards	8 CP			
Module description	Practical Training					
Module code	07-M/Ba-Prakt					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Ma	athematics				
Applies to degree courses / semesters	BSc Mathematics / From 2 <sup>nd</sup> semester onwards					
Module coordinator	Cf. German version					
Prerequisites for participation	None	None				
Course aims	Become familiar with professional practices for qualifications	or mathematicians, development of professi	ional skills and			
Contents of module	Completion of a practical training according to	o the placement regulations.				
Forms of instruction	Practical training: at least 6 weeks full time					
Total workload in hours	240	credit points 8 CP				
consisting of:						
A courses	Lecture / Seminar					
Aa contact hours	231 h hours of work (38,5 h / week)					
Ab preparation / follow- up						
B autonomous work in the module	90 h final report					
C examination						
Module-component examinations	Writing an ungraded practical training report					
Frequency, duration in semesters	At any time					
Intake capacity						
Language of instruction	German					

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Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.

Module codeOFaculty / subject / departmentIApplies to degree courses / semestersI	Preparation for Thesis in Algebra and Geometry 07-M/Ba-TVAG Faculty 07 / Mathematics / Department of Mathematics BSc Mathematics / from 4 <sup>th</sup> semester onwards				
Faculty / subject / departmentIApplies to degree courses / semestersI	Faculty 07 / Mathematics / Department of Mathematics				
department       Applies to degree courses / semesters					
semesters	BSc Mathematics / from 4 <sup>th</sup> semester onwards				
Module coordinator	BSc Mathematics / from 4 <sup>th</sup> semester onwards				
	Cf. German version				
Prerequisites for I participation	Linear Algebra 1, Linear Algebra 2, Algebra				
Course aims	<ul> <li>The students should</li> <li>complete and deepen the content of the module Linear Algebra 1+2 and Algebra</li> <li>realise coherences across lectures</li> <li>collect experience in dealing with mathematical literature</li> </ul>				
Contents of module	Syllabus of the modules Linear Algebra 1, Linear Algebra 2, Algebra				
	Counselling sessions with the examiner, autonomous study in small groups, repetition of learning content a glance, tandem learning				
Total workload in hours	120 credit points 4 CP	credit points 4 CP			
consisting of: A courses					
Aa contact hours	4 h counselling sessions with the examiner				
Ab preparation / follow- up					
B autonomous work in the module	115 h: autonomous work, exam preparation (in student teams)				
C examination	1 h final exam				
Module examination	Oral exam				
1 //	Summer or winter semester 1 semester				
Intake capacity	60				
Language of instruction	German				

Advice on module: see semester notice Date: see course catalogue Reading list: see semester notice

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07-M-BA-TVAna	Preparation for Thesis Analysis (V)	From 4 <sup>th</sup> semester onwards	4 CP		
Module description	Preparation for Thesis in Analysis				
Module code	07-M/Ba-TVAna				
Faculty / subject / department	Faculty 07 / Mathematics / Department of Math	ematics			
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester onwards				
Module coordinator	Cf. German version				
Prerequisites for participation	Analysis 1, Analysis 2, Analysis 3				
Course aims	<ul> <li>The students should</li> <li>complete and deepen the content of the module Linear Algebra 1+2 and Algebra</li> <li>realise coherences across lectures</li> <li>collect experience in dealing with mathematical literature</li> </ul>				
Contents of module	Syllabus of the modules Analysis 1, Analysis 2, Analys	nalysis 3			
Forms of instruction	Counselling sessions with the examiner, autonomous study in small groups, repetition of learning content at a glance, tandem learning				
Total workload in hours	120 cre	edit points 4 CP			
consisting of: A courses					
Aa contact hours	4 h counselling sessions with the examiner				
Ab preparation / follow- up					
B autonomous work in the module	115 h: autonomous work, exam preparation (in s	tudent teams)			
C examination	1 h final exam				
Module examination	Oral exam				
Frequency, duration in semesters	Summer or winter semester 1 semester				
Intake capacity	60				
Language of instruction	German				

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07-M-BA-TVAng	Preparation for Thesis in Applied N	Nathematics (V)	From 4 <sup>th</sup> semester onwards	4 CP		
Module description	Preparation for Thesis in Applied Mathematics					
Module code	07-M/Ba-TVAng					
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mat	Faculty 07 / Mathematics / Department of Mathematics				
Applies to degree courses / semesters	BSc Mathematics / from 4 <sup>th</sup> semester onwards					
Module coordinator	Cf. German version					
Prerequisites for participation	Two out of three modules of Numeric Mathematics 1, 2 and optimisation or the modules Probability and Statistics 1, 2					
Course aims	<ul> <li>The students should</li> <li>complete and deepen the content of two out of the three modules of Numeric Mathematics 1,2 or Probability and Statistics 1, 2</li> <li>realise coherences across lectures</li> <li>collect experience in dealing with mathematical literature</li> </ul>					
Contents of module	<ul> <li>Syllabus of two out of three the modules of Numeric Mathematics 1,2 and optimisation or Probability and Statistics 1, 2</li> </ul>					
Forms of instruction	Counselling sessions with the examiner, autonomous study in small groups, repetition of learning content at a glance, tandem learning					
Total workload in hours	120 c	redit points 4 CP				
consisting of: A courses						
Aa contact hours	4 h counselling sessions with the examiner					
Ab preparation / follow- up						
B autonomous work in the module	115 h: autonomous work, exam preparation (in student teams)					
C examination	1 h final exam					
Module examination	Oral exam					
Frequency, duration in semesters	Summer or winter semester 1 semester					
Intake capacity	60					
Language of instruction	German					

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07-M/BA-Thes	Bachelor Thesis (S)		6 <sup>th</sup> sem.	12 CP
Module description	Bachelor Thesis			
Module code	07-M/Ba-Thes			
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics			
Applies to degree courses / semesters	BSc Mathematics / 6th semester			
Module coordinator	Lecturers of Mathematics			
Prerequisites for participation	Special lecture or seminar or reading course in the field of the thesis.			
Course aims	The student compiles the bachelor thesis autonomously by using scientific methods. As a general rule, mathematical results are depicted completely and coherently on the basis of a sample taken from the literature at hand.			
Contents of module	Study of the relevant literature, writing of th	e thesis. Advice through s	supervisor.	
Forms of instruction	Seminar: 2 h per week			
Total workload in hours	360	credit points 12 CP		
consisting of: A courses	Thesis			
Aa contact hours	30 h: Talks with supervisor, poss. presentation (candidate seminar)			
Ab preparation / follow- up				
B autonomous work in the module	330 h: Work on thesis			
C examination				
Module examination	(Evaluation of the thesis.)			
Frequency, duration in semesters	Every semester, 1 semester			
Intake capacity				