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Table 1 (Mathematics Bachelor)

List of modules			ECTS Points			Field		Compulsory modules
No.	Name	Abbr.	F	A	S	AAG	AMS	
1	Analysis 1	Ana1	9			x		x
2	Linear Algebra 1	LA1	9			x		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			x	x
9	Probability and Statistics 1	Sto1		9			x	x
10	Analysis 4	Ana4			9	x		
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	MApp			9		x	
16	Numerical Analysis 2	Num2			9		x	
17	Optimisation	Opt			9		x	
18	Probability and Statistics	Sto2			9		x	
19	Approximation Theory	App			9		x	
20	Computer Algebra	CAlg			9		x	
21	Discrete Mathematics 2	DM2			9	x		
22	Elementary Differential Geometry	EDG			6	x		
23	Financial Engineering	FinE			6		x	
24	Reading Course Analysis Bachelor	AnaL			6	x		
25	Projective Geometry 1	PG1			9	x		
26	Calculation Course Algebra/ 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		x	
29	Advanced Course Applied Mathematics 4h	AM4S			9		x	
30	Advanced Course Stochastic Theory	StoS			6		x	
31	Game Theory	Spi			6	x		
32	Statistics and Simulations with R	R2			6		x	
33	Topology	Top			6	x		
34	Wavelets	Wav			9		x	
35	Elementary Partial Differential Equations	EPD			9	x		
36	Advanced Course Analysis Bachelor 4 h	AnaS4			6	x		
37	Algebra 2	Alg2			9	x		
38	Proseminar	Pro			6	x	x	x
39	Seminar	Sem			6	x	x	x
40	Bachelor thesis	Thes			12	x	x	x
41	Reading Course: Algorithmic Algebra	AlaLB			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			6	x		
45	Advanced Module Algebra: Complex Functions 4+2	KoF42			9	x		
46	Advanced Module Algebra: Complex Functions 3+1	KoF31			6	x		

47	Reading Course: Complex Functions	KoFLB			6	x		
48	Number Theory 4+2	ZT42			9	x		
49	Number Theory 3+1	ZT31			6	x		
50	Advanced Course in Discrete Mathematics 4+2	SDM42			9	x		
51	Advanced Course in Discrete Mathematics 3+1	SDM31			6	x		
52	Advanced Course in Discrete Mathematics 2+2	SDM22			6	x		
53	Advanced Course in Discrete Mathematics 2+0	SDM20			3	x		
54	Advanced Course in Geometry 4+2	SGe42			9	x		
55	Advanced Course in Geometry 3+1	SGe31			6	x		
56	Advanced Course in Geometry 2+2	SGe22			6	x		
57	Advanced Course in Geometry 2+0	SGe20			3	x		
58	Advanced Lecture Course in Numerical Analysis 4+2	SNu42			9		x	
59	Advanced Lecture Course in Numerical Analysis 3+1	SNu31			6		x	
60	Advanced Lecture Course in Numerical Analysis 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		x	
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		x	
65	Advanced Course in Probability and Statistics 2+0	SSt20			3		x	
66	Proseminar	Pro			6	x	x	x
67	Seminar Analysis	SemAn			6	x		
68	Seminar Topology	SemTo			6	x		
69	Number Theory	SemZt			6	x		
70	Seminar Algebraic Geometry	SemAG			6	x		
71	Seminar Complex Functions	SemKoF			6	x		
72	Seminar on Algorithmic Algebra	SemAlA			6	x		
73	Seminar on Groups, Rings, Modules	SemGRM			6	x		
74	Seminar in Discrete Mathematics	SemDM			6	x		
75	Seminar in Geometry	SemGe			6	x		
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	x	
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	x

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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07-M/BA-Ana1	**Analysis 1 (G)**	**1st sem.**	**9 CP**

Module description	Analysis 1	
Module code	07-M/BA-Ana1	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 1st semester, Teacher training Mathematics (L3) / 3rd semester	
Module coordinator	Cf. German version	
Prerequisites for participation	none	
Course aims	At the end of the module, students should • have made the transition from school to university • be familiar with logical reasoning and strict proof • command the fundamentals of differential and integral calculus of one variable	
Contents of module	Fundamentals, number systems, one-dimensional differential and integral calculus, especially power series, elementary functions, Taylor's theorem, fundamental theorem of calculus and calculation rules of differential and integral calculus.	
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: mid-term examination and final examination. Weighting according to lecturers. Retake examination: written or oral examination.	
Frequency, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
Language of instruction	German	

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

07-M/BA-LA1	**Linear Algebra 1 (G)**	**1st 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 semester	
Module coordinator	Cf. German version	
Prerequisites for participation	none	
Course aims	• To be familiar with logical reasoning and strict proofs • Insights into the deductive method • Knowledge of the fundamental structures of algebra • To learn to understand and apply the concept of structure preserving transformations (homomorphisms). Knowledge of normal forms. To understand the connection with linear equations.	
Contents of module	• Groups (elementary features) • Rings: subrings, integers, ring of endomorphism of a vector space, rings of matrix • Fields: real numbers, complex numbers • Vector spaces: linear independence, dimension, basis, subspace, quotient space, (direct) sum of subspaces, dimension formulas of subspaces, quotient space, R^n and C^n • Linear transformations: kernel, image, pre-image, isomorphism, sum and product of linear transformations, inverse transformation, restricted transformations, fundamental theorem on homomorphisms • Matrices: adding and multiplication, inverse, transposed and symmetric matrices, elementary conversions, rank, regularity and singularity, matrix representation of linear transformations (esp. with a change of basis), matrices as linear transformations • Determinants: of matrices and linear transformations, multi-linearity, theorem of multiplication, determinant, formula for an inverse matrix, Laplace expansion, Cramer's rule • System of linear equations: coefficient matrix, solution structure, Gaussian algorithm	
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	
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, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
Language of instruction	German	

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

07-I-BA-EP1	**Introduction to Programming 1 (G)**	**From 1st sem. onwards**	**4 CP**

Module description	Introduction to Programming 1		
Module code	07-I-BA-EP1		
Faculty / subject / department	Faculty 07 / Information Technology / Department of Information Technology		
Applies to degree courses / semesters	BSc Mathematics, 1st semester		
Module coordinator	Cf. German version		
Prerequisites for participation	none		
Course aims	The students should • have knowledge of the constructs of a higher programming language, • understand the fundamental concepts of programming and application languages, • have the skill to develop solutions for simple programming tasks in a higher programming language, • have knowledge of various programming paradigms, • command the methods used for analysis and design of small settings of tasks as well as their formal description, • be able to evaluate the applicability of concrete programming languages.		
Contents of module	• Introduction to programming languages • Introduction to an environment for software development • Fundamental concepts of higher programming languages • Constants, variables, types of data, pointer • Complex types of data: structures and arrays • Control structures, conditions and loops • Functions, parameter transfer, results of functions • Recursion • Classes, objects, instances		
Forms of instruction	Lecture: 2 h per week, Tutorial: 1 h per week		
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 successful participation in the tutorials. Examination: written or oral examination.		
Frequency, duration in semesters	winter semester, summer semester 1 semester		
Intake capacity	50		
Language of instruction	German		

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

07-M/BA-Ana2	**Analysis 2 (G)**	**2nd sem.**	**9 CP**

Module description	Analysis 2	
Module code	07-M/BA-Ana2	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 2nd semester, Teacher training Mathematics (L3) / 4th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1	
Course aims	At the end of the module, students should be able to command the fundamentals of differential and integral calculus in R^n.	
Contents of module	Differential calculus in R^n, curves and surfaces in R^n, introduction to multidimensional integration.	
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: mid-term examination and final examination. Weighting according to lecturers. Retake examination: written or oral examination.	
Frequency, duration in semesters	Every summer semester, 1 semester	
Intake capacity	200	
Language of instruction	German	

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

07-M/BA-LA2	**Linear Algebra 2 (G)**	**2nd 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) / 2nd semester	
Module coordinator	Cf. 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 Algebra 1	
Contents of module	• Rings: particularly polynomial rings, Euclidean algorithm • Eigenvalues: eigenvector, eigenspace, multiplicity, diagonalisation, characteristic polynomial, minimal polynomial, Cayley-Hamilton, Jordan normal form • Scalar products: Euclidean and unitary vector spaces, orthogonality, orthonormalisation process, orthogonal, unitary and self-adjoint endomorphisms and their normal forms	
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	
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, duration in semesters	Every summer semester, 1 semester	
Intake capacity	200	
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-Alg	**Algebra (A)**	**3rd or 5th sem.**	**9 CP**

Module description	Algebra	
Module code	07-M/BA-Alg	
Faculty / subject / department	Faculty 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 Linear Algebra 1, Linear Algebra 2	
Course aims	• Skill to calculate with cycles in permutation groups • Identification of isomorphisms between groups • Skill to apply the Sylow theorem (e.g. to construct a normal subgroup) • Recognition of irreducibility of polynomials • Determination of the splitting field and of the Galois group of a polynomial in simple cases	
Contents of module	• Groups, Subgroups, normal subgroups, factor groups, fundamental theorem on homomorphisms, operation of groups on sets, conjugation, Sylow theorems, automorphism groups of structures, cyclic groups, symmetric groups, cycle notation, solvable groups. • Rings, subrings, ideals, factor rings, fundamental theorem on homomorphisms, polynomial rings, division algorithm, criteria for irreducibility of polynomials, quotient fields. • Fields, subfields, characteristics, prime fields, field automorphisms, field expansions, splitting fields, Galois 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 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: mid-term examination and final examination. Weighting according to lecturer. Retake examination: written or oral examination.	
Frequency, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
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-Ana3	**Analysis 3 (A)**	**3rd or 5th sem.**	**9 CP**

Module description	Analysis 3	
Module code	07-M/BA-Ana3	
Faculty / subject / department	Faculty 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	
Course aims	Application of fundamental theorems on systems of ordinary differential equation, proofs of simple statements about solutions (calculation, asymptotic behaviour, phase portraits). Application of fundamental theorems of the theory of functions of a complex variable, calculation of line integrals, calculation of real integrals with the residue theorem, proofs of simple statements about holomorphic functions.	
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: 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, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
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-Num1	**Numerical Analysis 1 (A)**	**3rd or 5th sem.**	**9 CP**

Module description	Numerical Analysis 1	
Module code	07-M/BA-Num1	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 3rd or 5th semester, BSc Physics / 3rd semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	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	Rounding errors; Gaussian elimination with and without pivot search; Iterative methods for systems of linear equations: Jacobi/Gauss-Seidel; Polynomial interpolation: solvability, Lagrange form, Newton form, divided differences; Splines: spline space, B-splines, interpolation; Finding of roots: bisection method, secant method and Newton's method; Elementary quadrature rules, compound quadrature formula, Gaussian quadrature; Banach fixed point theorem.	
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	
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	
Intake capacity	150	
Language of instruction	German or English	

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

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07-M/BA-Sto1	**Statistics 1 (A)**	**3rd or 5th sem.**	**9 CP**

Module description	**Probability and Statistics** 1	
Module code	07-M/BA-Sto1	
Faculty / subject / department	Faculty 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 Linear Algebra 1, Linear Algebra 2	
Course aims	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 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: mid-term examination and final examination. Weighting according to lecturer. Retake examination: written or oral examination.	
Frequency, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
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-Ana4	**Analysis 4 (S)**	**4th or 6th sem.**	**9 CP**
Module description	Analysis 4		
Module code	07-M/BA-Ana4		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Analysis 3, Linear Algebra 1, Linear Algebra 2		
Course aims	The students should be able to deal with Lebesgue integration and Hilbert and Banach spaces.		
Contents of module	Lebesgue integration, Hilbert and Banach spaces, Fourier series and Fourier transform, linear elliptic, hyperbolic and parabolic partial differential equations.		
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 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		
Intake capacity	200		
Language of instruction	German		

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

07-M/BA-DM	**Discrete Mathematics 1 (S)**	**4th sem.**	**9 CP**

Module description	Discrete Mathematics 1	
Module code	07-M/BA-DM	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Linear Algebra 1, Algebra	
Course aims	Fundamentals of counting theory (knowledge of the elementary counting coefficients and counting techniques). Implementation of problems into the language of graph theory, command of techniques.	
Contents of module	Combinatorics: counting coefficients, inclusion-exclusion, further counting techniques and methods as for example generating functions, Möbius inversion formula, cycle indices. Graph theory: fundamentals, classical topics as for example trees, networks, flows. Optional: Coder	
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	
Module examination	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	200	
Language of instruction	German	

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

07-M/BA-R1	**Fundamentals of Data Analysis with R (V)**	**4th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Probability and Statistics 1	
Course aims	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 • know the fundamental data structures in R as well as possibilities of import and export of data, • be familiar with a numerical and particularly graphical exploratory data analysis in R, • be able to implement new functions in R, • command applied inference statistics (tests and parameter estimation in basic univariate uni- and multi-sample problems) for continual and discrete data.	
Contents of module	• Introduction to the R-environment • Data structures in R as well as import and export of data • Elemental exploratory data analysis with R incl. theory • Fundamentals of programming in R and graphics • R-functions for the inference statistics of selected para- and non-parametric, univariate uni- and multi-sample problems (incl. recapitulation of some theoretical basics)	
Forms of instruction	Lecture: 2 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	30 h	60 h
B autonomous work in the module		
C examination	30 h (either examination preparation and examination, or project with report and presentation)	
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	
Intake capacity	20	
Language of instruction	German (by request in English)	

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

07-M/BA-Gru	**Group Theory (V)**	**4th sem.**	**9 CP**

Module description	Introduction to Group Theory	
Module code	07-M/BA-Gru1	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 3rd semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Linear Algebra 1, Linear Algebra 2, Algebra	
Course aims	• The skill to calculate in concrete groups (e.g. matrix groups or permutation groups) • The skill to compute group characters in simple cases • The skill to determine a group presented by generators and relations in simple cases	
Contents of module	• Sentence Structure for groups • Permutation groups. • Linear representation of groups (Maschke's theorem, Schur's Lemma, group characters) • Free groups, presentations by generators and relations	
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 examination	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	
Language of instruction	German	

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

07-M/BA-AlgL	**Reading Course Algebra (V)**	**6th sem.**	**6 CP**

Module description	Reading Course Algebra	
Module code	07-M/BA-AlgL	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 3rd semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Algebra, Introduction to Group Theory	
Course aims	• The skill to independently study the course literature and research • The skill to complete drafted proofs • The skill to analyse a counter-example • Presentation and explanation of the studied texts	
Contents of module	E.g. • Topics from representation theory • Finite groups • Geometric group theory • Classic groups and metric spaces • Buildings and groups of Lie type	
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, duration in semesters	irregular 1 semester	
Intake capacity	10	
Language of instruction	English	

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

07-M/BA-MApp	**Multidimensional Approximation Theory (V)**	**From 3rd sem. onwards**	**9 CP**

Module description	Multidimensional Approximation Theory	
Module code	07-M/BA-MApp	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 3rd semester onwards, MSc Mathematics	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	The skill to apply and analyse approximation methods as well as their mathematical analysis: existence, uniqueness, convergence.	
Contents of module	Fundamentals of multidimensional approximation theory; Polynomial approximation, spline approximation; Approximation with spaces of radial base functions; multidimensional wavelets.	
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 examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	winter semester, irregular, 1 semester	
Intake capacity	150	
Language of instruction	German or English	

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

07-M/BA-Num2	**Numerical Analysis 2 (V)**	**4th or 6th sem.**	**9 CP**

Module description	Numerical Analysis 2	
Module code	07-M/BA-Num2	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th semester, BSc Physics / 4th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1 - 2, Linear Algebra 1 - 2, Numerical Analysis 1	
Course aims	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, 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 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	
Intake capacity	150	
Language of instruction	German or English	

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

07-M/BA-Opt	**Optimisation (V)**	**4th or 6th sem.**	**9 CP**

Module description	Optimisation	
Module code	07-M/BA-Opt	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th semester, BSc Physics / 4th or 6th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 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	Linear optimisation: simplex algorithm, transportation problems, interior point methods; non-linear optimisation without constraints: Quasi-Newton algorithms, algorithms of DFP and BFGS; --- with linear constraints: Kuhn-Tucker conditions and algorithms, e.g. trust region methods; --- with non-linear constraints: penalty algorithms.	
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 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	
Intake capacity	150	
Language of instruction	German or English	

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

07-M/BA-Sto2	**Statistics 2 (V)**	**4th or 6th sem.**	**9 CP**

Module description	Probability and Statistics 2	
Module code	07-M/BA-Sto2	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2, Stochastic Theory 1	
Course aims	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	Fundamentals of probability theory concerning multivariate problems as random vectors, multidimensional distributions, particularly multidimensional normal distributions, vectors of expectation, covariance matrices, linear pattern, F-test	
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 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	
Intake capacity	200	
Language of instruction	German	

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

07-M/BA-App	**Approximation Theory (V)**	**5th sem.**	**9 CP**

Module description	Approximation Theory	
Module code	07-M/BA-App	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 5th semester, MSc Physics	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	The skill to apply and analyse approximation methods as well as their mathematical analysis: existence, uniqueness, convergence.	
Contents of module	Fundamentals of approximation theory; Polynomial approximation, approximation order (Jackson theorems); Minimax approximations; Spline approximation / approximations with rational functions; Multidimensional approximation / approximation with translation-invariant spaces.	
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 examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Every other winter semester, 1 semester	
Intake capacity	150	
Language of instruction	German or English	

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

07-M/BA-CAlg	**Computer Algebra (V)**	**4th or 6th 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 6th semester, MSc Mathematics, BSc Physics	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	Understanding the fundamental concepts of an efficient computer algebra relevant to problems of application.	
Contents of module	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, 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 examination	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	50	
Language of instruction	German or English	

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

07-M/BA-Kom	**Linear Algebra in Combinatorics**	**From 4th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Linear Algebra	
Course aims	Students get in insight into the application of linear algebra in order to solve combinatorial questions.	
Contents of module	1. Incidence structures, block designs 2. Strongly regular graphs 3. Dimension arguments 4. Eigenvalue techniques 5. Incidence matrices	
Forms of instruction	Lecture: 2 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	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 4th semester	
Intake capacity	200	
Language of instruction	German/English	

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

07-M/BA-EDG	**Elementary Differential Geometry (V)**	**5th sem.**	**6 CP**

Module description	Elementary Differential Geometry	
Module code	07-M/BA-EDG	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 5th semester	
Module coordinator	Th. Bartsch	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2	
Course aims	The students should be familiar with curves and surfaces in space as well as with their internal geometry.	
Contents of module	– Curves and surfaces – Riemannian metric – Concepts of curvature – Gaussian theorem (theorema egregium)	
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 and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Winter semester, irregular, 1 semester	
Intake capacity	200	
Language of instruction	German / English	

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

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 Engineering (S)**	**5th 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 semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1 - 2, Linear Algebra 1 - 2 and Stochastic Theory 1 - 2	
Course aims	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	Fundamentals of financial engineering and financial mathematics. Description of products and evaluation of simple options in discrete models as e.g. binary trees. Fundamental concepts of no-arbitrage bounds, replication strategy and risk neutral evaluation. Simple risk models, elemental hedging methods.	
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 and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Every winter semester, 1 semester	
Intake capacity	200	
Language of instruction	German	

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

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 Bachelor (S)**	**4th or 5th sem.**	**6 CP**
Module description	Reading Course Analysis Bachelor		
Module code	07-M/BA-AnaL		
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics		
Applies to degree courses / semesters	BSc Mathematics / 4th or 5th semester		
Module coordinator	Cf. German version		
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Analysis 3		
Course aims	Independent study of course literature with analysis and addition of proofs; presentation of the subjects learned.		
Contents of module	E.g. regarding the topic ”Submanifolds and theorems of integration” – submanifolds, tangent space, orientation, compact sets with smooth boundary, integration on submanifolds, Gaussian theorem, Green’s identities, examples. Or e.g. regarding the topic ”Partial differential equations” – linear partial differential equations, distributions, fundamental solution, inhomogeneous equations, maximum principle, initial and boundary value problems.		
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		
Frequency, duration in semesters	Every summer semester, 1 semester		
Intake capacity			
Language of instruction	German / English		

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

07-M/BA-Geo	**Geometry (V)**	**5th sem.**	**9 CP**

Module description	Projective Geometry 1	
Module code	07-M/BA-PG1	
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 fundamental lectures	
Course aims	Students should be familiar with basic concepts and structures of geometry	
Contents of module	1. Affine and projective spaces ; configurations 2. Metric spaces (spherical, euclidean and hyperbolic metric); regular point systems/ latttices; discrete symmetry groups 3. [optional] basic differential geometry 4. [optional] basic algebraic geometry 5. [optional] elliptic, euclidean, hyperbolic geomety	
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 examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Irregular, winter semester, approx. every 4th semester 1 semester	
Intake capacity	50	
Language of instruction	German/English	

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

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 Theory with GAP or MAGMA (V)**	**From 4th 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 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, Introduction to Group Theory	
Course aims	• Skill to use scientific software (computer algebra system) • Skill to implement group theoretical problems into computer language	
Contents of module	On the basis of the knowledge gained in Algebra and Group Theory, students will work with a computer algebra system (e.g. GAP or MAGMA): • Working with basic objects, as groups, rings, fields, vector spaces, their elements and substructures • Working with transformations (injective function, surjective function, characteristics of homomorphisms) • Working with representations • Working with free groups and groups built by presentations • Implementation of simple algorithms • Usage of complex algorithms, e.g. Todd-Coxeter algorithm	
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, duration in semesters	Every other winter semester, 1 semester	
Intake capacity	10	
Language of instruction	German	

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

07-M/BA-Spi	**Game Theory (V)**	**From 5th sem. onwards**	**6 CP**

Module description	Game Theory	
Module code	07-M/BA-Spi	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 5th semester, MSc Mathematics in Practice	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	Knowledge of the fundamental concepts of game theory and of the theorems of equilibrium.	
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, 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	45h
B autonomous work in the module		
C examination	30 h preparation and examination	
Module examination	Performance during semester: regular and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Every other winter semester, 1 semester	
Intake capacity	30	
Language of instruction	German or English	

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

07-M/BA-R2	**Statistics and Simulations with R (V)**	**5th sem.**	**6 CP**

Module description	Statistics and Simulations with R	
Module code	07-M/BA-R2	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 5th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Probability and Statistics 1, Probability and Statistics 2, Fundamentals of Data Analysis with R	
Course aims	The students learn the usage of statistical techniques as well as the realisation of the Monte Carlo method in the "open-source" software R and should • command applied inferential statistics for selected univariate uni- and multi-sample problems as well as for simple linear regression, • be able to use probability distributions and the generation of pseudorandom numbers in R, • know principles and problems as well as R-specific advantages and disadvantages of various implementations of simulation. • be familiar with examples for simulation studies, • be able to present simulation studies and their results.	
Contents of module	• R-functions for inferential statistics of selected para- and non-parametric univariate uni- and multi-sample problems (incl. recapitulation of some theoretical bascis) • Introduction to simple linear regression with R • R-functions probability distributions and pseudo-random numbers • Simulation of the "strong law of large numbers" in several examples • A variety of simulations on the basis of "random walks", e.g. for ruin problems, childbirth processes, trees, Markov chains	
Forms of instruction	Lecture: 2 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	30 h	60 h
B autonomous work in the module		
C examination	30 h (either examination preparation and examination, or project with report and presentation)	
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 winter semester, 1 semester	
Intake capacity	20	
Language of instruction	German (by request in English)	

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

07-M/BA-Top	**Topology (v)**	**From 4th sem. onwards**	**6 CP**

Module description	Topology	
Module code	07-M/BA-Top	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 5th semester	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2	
Course aims	The students should have knowledge of the fundamental terms and propositions of topology as well as important classes of topological spaces.	
Contents of module	– Topological spaces and continuous mappings – Sums, products, quotients – Compactness – Extension theorems by Tietze and Urysohn – Fundamental Group	
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 and successful participation in the tutorials. Examination: written or oral examination.	
Frequency, duration in semesters	Irregular, approx. every other winter semester, 1 semester	
Intake capacity	200	
Language of instruction	German / English	

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

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)**	**4th or 6th sem.**	**9 CP**

Module description	Wavelets	
Module code	07-M/BA-Wav	
Faculty / subject / department	Faculty 07 / Mathematics / Department of Mathematics	
Applies to degree courses / semesters	BSc Mathematics / 4th or 6th semester, BSc Physics / 4th or 6th semester, MSc Mathematics	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Analysis 1, Analysis 2, Linear Algebra 1, Linear Algebra 2	
Course aims	Knowledge of the concept of wavelets and their analysis; application, development and evaluation of numerical methods on the basis of wavelets.	
Contents of module	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, 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 examination	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	50	
Language of instruction	German or English	

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

07-M/BA-EPD	**Elementary Partial Differential Equations (S)**	**From 4th sem. onwards**	**9 CP**

Module description	Elemental Partial Differential Equations	
Module code	07-M/BA-EPD	
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	Analysis 1 – 3, Linear Algebra 1, 2 or comparable knowledge	
Course aims	The students should become familiar with the most important kinds of linear partial differential equations and boundary value problems as well as with classical methods for their solution.	
Contents of module	- Equations of first and second order - Boundary value problems - Harmonic functions	
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	Irregular, about every fourth semester, 1 semester	
Intake capacity	200	
Language of instruction	German / English	

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

07-M/BA-Alg2	**Algebra 2 (S)**	**From 4th 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	
Language of instruction	German	

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

07-M/BA-San42	**Advanced Course in Analysis 4+2 (V)**	**From 5th 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 Mathematics	
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 of Analysis – intermediate level	
Contents of module	Special fields of analysis, e.g. Differential Geometry, Bifurcation Theory, Differential Equations, Chaotic Dynamics, etc.	
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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-San31	**Advanced Course in Analysis 3+1 (V)**	**From 5th sem. onwards**	**6 CP**

Module description	Advanced Course in Analysis 3+1	
Module code	07-M/BA-San31	
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 of Analysis 1-3	
Course aims	Acquiring a more profound knowledge of Analysis – intermediate level	
Contents of module	Special fields of analysis, e.g. Differential Geometry, Bifurcation Theory, Differential Equations, Chaotic Dynamics, etc.	
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-STo42	**Advanced Course Topology 4+2 (V)**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Course in Topology 4+2	
Module code	07-M/BA-STo42	
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 of Analysis 1-3, basic ideas of topology	
Course aims	Acquiring a more profound knowledge of topology – intermediate level	
Contents of module	Special fields of topology, e.g. algebraic topology, differential topology, topological methods of nonlinear analysis, etc	
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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-STo42	**Advanced Course Topology 3+1 (V)**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Course in Topology 3+1	
Module code	07-M/BA-STo31	
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 of Analysis 1-3, basic ideas of topology	
Course aims	Acquiring a more profound knowledge of topology – intermediate level	
Contents of module	Special fields of topology, e.g. algebraic topology, differential topology, topological methods of nonlinear analysis, etc	
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-ALG42	**Advanced Module: Algebraic Geometry 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Algebraic Geometry 4+2	
Module code	07-M/BA-ALG 42	
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	To realize the relation between algebraic concepts and methods of complex analysis. Providing fundamentals for studies of algebraic groups	
Contents of module	Basis theorem, Noether Normalisation , Hilbert's Nullstellensatz Additional topics in complex algebraic geometry, of algebraic curves or algebraic groups	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ALG31	**Advanced Module: Algebraic Geometry 3+1 (V)**	**From 4th sem. onwards**	**6 CP**

Module description	Algebraic Geometry 3+1	
Module code	07-M/BA-ALG 31	
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	To realize the relation between algebraic concepts and methods of complex analysis. Providing fundamentals for studies of algebraic groups	
Contents of module	Basis theorem, Noether Normalisation , Hilbert's Nullstellensatz Additional topics in complex algebraic geometry, of algebraic curves or algebraic groups	
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	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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ALA42	**Advanced Module Algebra: Algorithmic Algebra 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Algebraic Geometry 4+2	
Module code	07-M/BA-ALA 42	
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	• Basic knowledge of lecture contents • Be familiar with the basics of algorithmic thinking	
Contents of module	Deepening contents of mathematics in the area of algorithmic algebra such as computer algebra, determination of t he (simplicial) homology of specific simplicial complexes, computation of group presentations from their properly discontinuous action on simply connected topological spaces with well-understood stabilizers, concrete computations with (possibly non-commutative) Gröbner bases .	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ALA31	**Advanced Module Algebra: Algorithmic Algebra 3+1 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Algebraic Geometry 4+2	
Module code	07-M/BA-ALA 42	
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	• Basic knowledge of lecture contents • Be familiar with the basics of algorithmic thinking	
Contents of module	Deepening contents of mathematics in the area of algorithmic algebra such as computer algebra, determination of t he (simplicial) homology of specific simplicial complexes, computation of group presentations from their properly discontinuous action on simply connected topological spaces with well-understood stabilizers, concrete computations with (possibly non-commutative) Gröbner bases.	
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, at least one advanced module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ALALB	**Reading Course: Algorithmic Algebra**	**From 4th 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 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	• Be able to autonomously study literature • Be able to complete outlined proofs • Be able to analyse a counterexample • Present and explain the texts read	
Contents of module	Deepening contents of mathematics in the area of algorithmic algebra such as computer algebra, determination of t he (simplicial) homology of specific simplicial complexes, computation of group presentations from their properly discontinuous action on simply connected topological spaces with well-understood stabilizers, concrete computations with (possibly non-commutative) Gröbner bases .	
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	75 h studies of literature	
C examination	15 h exam preparation	
Module-component examinations	Oral or written exam or presentations during the reading course	
Frequency, duration in semesters	Irregular 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-GRM42	**Advanced Module Algebra: Groups, Rings, modules 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Groups, Rings, Modules 4+2	
Module code	07-M/BA-GRM42	
1st 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 onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Knowledge of Linear Algebra I+II and Algebra	
Course aims	• Basic knowledge of lecture contents • Provide fundamentals for the study of Lie-algebras, commutative algebras, performance of groups, algebraic K-theory	
Contents of module	Semisimple modules, chain condition. Deepened mathematical contents of group, rings and/or modules theory such as combinatorial or geometric group theory, commutative algebra, homological algebra, classic algebraic K-functions or non-commutative algebra/geometry.	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-GRM31	**Advanced Module Algebra: Groups, Rings, modules 3+1 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Groups, Rings, Modules 4+2	
Module code	07-M/BA-GRM31	
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	• Basic knowledge of lecture contents • Provide fundamentals for the study of Lie-algebras, commutative algebras, performance of groups, algebraic K-theory	
Contents of module	Semisimple modules, chain condition. Deepened mathematical contents of group, rings and/or modules theory such as combinatorial or geometric group theory, commutative algebra, homological algebra, classic algebraic K-functions or non-commutative algebra/geometry	
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, at least one advanced module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-GRMLB	**Reading Course: Groups, Rings and Modules**	**From 4th 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	• Basic knowledge of lecture contents • Provide fundamentals for the study of Lie-algebras, commutative algebras, performance of groups, algebraic K-theory	
Contents of module	Semisimple modules, chain condition. Deepened mathematical contents of group, rings and/or modules theory such as combinatorial or geometric group theory, commutative algebra, homological algebra, classic algebraic K-functions or non-commutative algebra/geometry	
Forms of instruction	Lecture: 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	75 h studies of literature	
C examination	15 h exam preparation	
Module-component examinations	Oral or written exam or presentations during the reading course	
Frequency, duration in semesters	Irregular 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-KoF42	**Advanced Module Algebra: Complex Functions 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Complex Functions 4+2	
Module code	07-M/Ba-KoF42	
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	• Basic knowledge of lecture contents • Usage of methods of algebra, geometry, topology and analysis • Knowledge of a deeper connection between the above named areas of abstract mathematics	
Contents of module	Advanced mathematical contents from an area of the theory of functions of a complex variable, such as studying meromorphic functions on the Riemann sphere, determination of the field of meromorphic functions of a specific compact Riemannian surface, theorem of Riemann-Roch in this context, properties of modular group and Fuchsian groups, Riemannian surface of an algebraic function, coverings, monodromy groups, Weierstraß product theorem, field of meromorphic functions of a domain as quotient field of the ring of holomorphic functions of that domain ...	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-KoF31	**Advanced Module Algebra: Complex Functions 3+1 (V)**	**From 4th sem. onwards**	**6 CP**

Module description	Complex Functions 4+2	
Module code	07-M/Ba-KoF31	
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	• Basic knowledge of lecture contents • Usage of methods of algebra, geometry, topology and analysis • Knowledge of a deeper connection between the above named areas of abstract mathematics	
Contents of module	Advanced mathematical contents from an area of the theory of functions of a complex variable, such as studying meromorphic functions on the Riemann sphere, determination of the field of meromorphic functions of a specific compact Riemannian surface, theorem of Riemann-Roch in this context, properties of modular group and Fuchsian groups, Riemannian surface of an algebraic function, coverings, monodromy groups, Weierstraß product theorem, field of meromorphic functions of a domain as quotient field of the ring of holomorphic functions of that domain ...	
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	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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-KoFLB	**Reading Course: Complex Functions**	**From 4th sem. onwards**	**6 CP**

Module description	Reading Course: Complex Functions	
Module code	07-M/Ba-KoFLB	
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	• Be able to autonomously study literature • Be able to complete outlined proofs • Be able to analyse a counterexample • Present and explain the texts read	
Contents of module	Advanced mathematical contents from an area of the theory of functions of a complex variable, such as studying meromorphic functions on the Riemann sphere, determination of the field of meromorphic functions of a specific compact Riemannian surface, theorem of Riemann-Roch in this context, properties of modular group and Fuchsian groups, Riemannian surface of an algebraic function, coverings, monodromy groups, Weierstraß product theorem, field of meromorphic functions of a domain as quotient field of the ring of holomorphic functions of that domain ...	
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	75 h studies of literature	
C examination	15 h exam preparation	
Module-component examinations	Oral or written exam or presentations during the reading course	
Frequency, duration in semesters	Irregular 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-ZT42	**Advanced Module Algebra: Number Theory 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Number Theory 4+2	
Module code	07-M/Ba-ZT42	
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	• Basic knowledge of number theory • Usage of algebraic methods in an allied mathematic field	
Contents of module	Chinese remainder theorem, quadratic reciprocity Advanced results of algebraic, algorithmic or analytical number theory For example: quadratic number rings, primality tests or prime number distribution	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ZT42	**Advanced Module Algebra: Number Theory 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Number Theory 4+2	
Module code	07-M/Ba-ZT42	
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	• Basic knowledge of number theory • Usage of algebraic methods in an allied mathematic field	
Contents of module	Chinese remainder theorem, quadratic reciprocity Advanced results of algebraic, algorithmic or analytical number theory For example: quadratic number rings, primality tests or prime number distribution	
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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-ZT31	**Advanced Module Algebra: Number Theory 4+2 (V)**	**From 4th sem. onwards**	**9 CP**

Module description	Number Theory 4+2	
Module code	07-M/Ba-ZT42	
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	• Basic knowledge of number theory • Usage of algebraic methods in an allied mathematic field	
Contents of module	Chinese remainder theorem, quadratic reciprocity Advanced results of algebraic, algorithmic or analytical number theory For example: quadratic number rings, primality tests or prime number distribution	
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	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 module in algebra offered every year 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-SDM42	**Advanced Course in Discrete Mathematics 4+2**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Discrete Mathematics	
Course aims	Acquiring a more profound knowledge of an area of discrete mathematics	
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: 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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-SDM31	**Advanced Course in Discrete Mathematics 3+1 (V)**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Discrete Mathematics	
Course aims	Acquiring a more profound knowledge of an area of discrete mathematics	
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	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	

07-M/BA-SDM22	**Advanced Course in Discrete Mathematics 2+2**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 5th semester onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Discrete Mathematics	
Course aims	Acquiring a more profound knowledge of an area of discrete mathematics	
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 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 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-SDM20	**Advanced Course in Discrete Mathematics 2+0 (V)**	**From 5th sem. onwards**	**3 CP**

Module description	Number Theory 4+2	
Module code	07-M/Ba-SDM20	
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	Discrete Mathematics	
Course aims	Acquiring a more profound knowledge of an area of discrete mathematics	
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	Tutorial
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	

07-M/BA-SGe42	**Advanced Course in Geometry 4+2 (V)**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	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	
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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-SGe31	**Advanced Course in Geometry 3+1 (V)**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	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	
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	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	

07-M/BA-SGe22	**Advanced Course in Geometry 2+2 (V)**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	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	
Forms of instruction	Lecture: 2 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 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-SGe20	**Advanced Course in Geometry 2+0 (V)**	**From 5th 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 Mathematics	
Applies to degree courses / semesters	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	
Forms of instruction	Lecture: 2 h per week	
Total workload in hours	90	credit points 3 CP
consisting of: A courses	Lecture	Tutorial
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	

07-M/BA-SNu42	**Advanced Lecture Course in Numerical Analysis 4+2**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Lecture Course in Numerical Analysis 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 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, 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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-SNu31	**Advanced Lecture Course in Numerical Analysis 3+1 (V)**	**From 5th sem. onwards**	**6 CP**

Module description	Advanced Lecture Course in Numerical Analysis 3+1	
Module code	07-M/Ba-SNu31	
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 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: 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 Course in Numerical Analysis 2+2 (V)**	**From 5th sem. onwards**	**6 CP**

Module description	Advanced Lecture Course in Numerical Analysis 2+2	
Module code	07-M/Ba-SNu22	
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 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, 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 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-SNu20	**Advanced Lecture Course in Numerical Analysis 2+0 (V)**	**From 5th sem. onwards**	**6 CP**

Module description	Advanced Lecture Course in Numerical Analysis 2+0	
Module code	07-M/Ba-SNu22	
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 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	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	

07-M/BA-SSt42	**Advanced Course in Probability and Statistics 4+2 (V)**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Course in Probability and Statistics 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: 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 1 semester	
Intake capacity	200	
Language of instruction	German/English	

07-M/BA-SSt31	**Advanced Course in Probability and Statistics 3+1 (V)**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Course in Probability and Statistics 4+2	
Module code	07-M/Ba-SSt31	
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: 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	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	

07-M/BA-SSt22	**Advanced Course in Probability and Statistics 2+2 (V)**	**From 5th sem. onwards**	**9 CP**

Module description	Advanced Course in Probability and Statistics 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: 2 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 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-SSt20	**Advanced Course in Probability and Statistics 2+0 (V)**	**From 5th sem. onwards**	**3 CP**

Module description	Advanced Course in Probability and Statistics 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	

07-M/BA-Pro	**Proseminar (V)**	**From 2nd 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	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present understandebly and accurately their content in front of an audience.	
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	credit points 6 CP
consisting of: A courses	Proseminar	
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, duration in semesters	At least every summer semester, 1 semester	
Intake capacity	15	
Language of instruction	German	

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

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)**	**5th or 6th 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	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	At least every summer semester, 1 semester	
Intake capacity	15	
Language of instruction	German	

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

07-M/BA-SemTo	**Seminar Topology (V)**	**5th or 6th sem.**	**6 CP**

Module description	Seminar in Topology	
Module code	07-M/Ba-SemTo	
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 , basic terms of topology	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take place.	
Contents of module	Scientific texts about various topics of topology. 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	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 as “passed”	
Frequency, duration in semesters	At least every summer semester, 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemZt	**Number Theory (V)**	**5th or 6th 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	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. Following a lecture on number theory 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemAG	**Seminar Algebraic Geometry (V)**	**5th or 6th sem.**	**6 CP**

Module description	Seminar on Algebraic Geometry	
Module code	07-M/Ba-SemAG	
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 on algebraic geometry	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. Following a lecture on algebraic geometry 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemKoF	**Seminar on Complex Functions (V)**	**From 4th sem. onwards**	**6 CP**

Module description	Seminar on Complex Functions	
Module code	07-M/Ba-SemKoF	
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	Linear Algebra I, II, Algebra, Analysis I, II, III, Lecture Complex Functions	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take place.	
Contents of module	Scientific texts on several topics or on an area of the theory of functions of a complex variable, such as studying meromorphic functions on the Riemann sphere, determination of the field of meromorphic functions of a specific compact Riemannian surface, theorem of Riemann-Roch in this context, properties of modular group and Fuchsian groups, Riemannian surface of an algebraic function, coverings, monodromy groups, Weierstraß product theorem, field of meromorphic functions of a domain as quotient field of the ring of holomorphic functions of that domain ... 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	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 as “passed”	
Frequency, duration in semesters	Irregular. Following a lecture on complex functions 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemAlA	**Seminar on Algorithmic Algebra (V)**	**From 4th sem. onwards**	**6 CP**

Module description	Seminar on Algorithmic Algebra	
Module code	07-M/Ba-SemKoF	
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	Linear Algebra I, II, Algebra	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take place.	
Contents of module	Scientific texts from an area of algorithmic algebra such as computer algebra, determination of t he (simplicial) homology of specific simplicial complexes, computation of group presentations from their properly discontinuous action on simply connected topological spaces with well-understood stabilizers, concrete computations with (possibly non-commutative) Gröbner bases . 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	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 as “passed”	
Frequency, duration in semesters	Irregular. Following a lecture on algorithmic algebra 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemGRM	**Seminar on Groups, Rings, Modules (V)**	**From 4th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Linear Algebra I, II, Algebra, Lecture on Groups, Rings and Modules	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take place.	
Contents of module	Scientific texts about various topics or a group of themes of rings and/or modules theory such as combinatorial or geometric group theory, commutative algebra, homological algebra, classic algebraic K-functions or non-commutative algebra/geometry 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	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 as “passed”	
Frequency, duration in semesters	Irregular. Following a lecture on groups, rings, modules 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemDM	**Seminar in Discrete Mathematics**	**5th or 6th semester**	**6 CP**

Module description	Seminar in Discrete Mathematics	
Module code	07-M/Ba-SemDM	
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	Discrete Mathematics	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. 1 semester	
Intake capacity	15	
Language of instruction	German	

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-SemGe	**Seminar in Geometry**	**5th or 6th semester**	**6 CP**

Module description	Seminar in Geometry	
Module code	07-M/Ba-SemGe	
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	Geometry	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemNu	**Seminar in Numerical Analysis**	**5th or 6th semester**	**6 CP**

Module description	Seminar in Geometry	
Module code	07-M/Ba-SemNu	
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	Depending on subject-related orientation	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	At least every summer semester 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-SemSt	**Seminar in Probability and Statistics**	**5th or 6th semester**	**6 CP**

Module description	Seminar in Probability and Statisctics	
Module code	07-M/Ba-SemSt	
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	Probability and Statistics 1 + 2	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. 1 semester	
Intake capacity	15	
Language of instruction	German	

7-M/BA-SemFi	**Seminar in Finance**	**5th or 6th semester**	**6 CP**

Module description	Seminar in Finance	
Module code	07-M/Ba-SemGe	
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	Probability and Statistics 1+2, Financial Engineering	
Course aims	The students should learn • to become acquainted with scientific texts • to discover shortcomings (lack of evidence, etc.) and, preferably, to correct them • to present coherently and accurately their content in front of an audience. Furthermore, in seminars, an introduction to the field of the subsequent thesis can take 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 research.	
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 as “passed”	
Frequency, duration in semesters	Irregular. 1 semester	
Intake capacity	15	
Language of instruction	German	

07-M/BA-Prakt	**Practical Training**	**From 2nd sem. onwards**	**8 CP**

Module description	Practical Training	
Module code	07-M/Ba-Prakt	
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	None	
Course aims	Become familiar with professional practices for mathematicians, development of professional skills and qualifications	
Contents of module	Completion of a practical training according to 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	

07-M-BA-TVAG	**Preparation for Thesis in Algebra and Geometry (V)**	**From 4th semester onwards**	**4 CP**

Module description	Preparation for Thesis in Algebra and Geometry	
Module code	07-M/Ba-TVAG	
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	Linear Algebra 1, Linear Algebra 2, Algebra	
Course aims	The students should • complete and deepen the content of the module Linear Algebra 1+2 and Algebra • realise coherences across lectures • collect experience in dealing with mathematical literature	
Contents of module	Syllabus of the modules Linear Algebra 1, Linear Algebra 2, Algebra	
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	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	
Frequency, duration in semesters	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

07-M-BA-TVAna	**Preparation for Thesis Analysis (V)**	**From 4th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 4th semester onwards	
Module coordinator	Cf. German version	
Prerequisites for participation	Analysis 1, Analysis 2, Analysis 3	
Course aims	The students should • complete and deepen the content of the module Linear Algebra 1+2 and Algebra • realise coherences across lectures • collect experience in dealing with mathematical literature	
Contents of module	Syllabus of the modules Analysis 1, Analysis 2, Analysis 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	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	
Frequency, duration in semesters	Summer or winter semester 1 semester	
Intake capacity	60	
Language of instruction	German	

07-M-BA-TVAng	**Preparation for Thesis in Applied Mathematics (V)**	**From 4th 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 Mathematics	
Applies to degree courses / semesters	BSc Mathematics / from 4th 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	The students should • complete and deepen the content of two out of the three modules of Numeric Mathematics 1,2 or Probability and Statistics 1, 2 • realise coherences across lectures • collect experience in dealing with mathematical literature	
Contents of module	• Syllabus of two out of three the modules of Numeric Mathematics 1,2 and optimisation or Probability and Statistics 1, 2	
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	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	
Frequency, duration in semesters	Summer or winter semester 1 semester	
Intake capacity	60	
Language of instruction	German	

07-M/BA-Thes	**Bachelor Thesis (S)**	**6th 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 the thesis. Advice through 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		
Language of instruction	German	