

Module title		Abbreviation
Overview Algebra and Applied Algebra for Teaching Degree (German Gymnasium)		10-M-AALL-Ü-191-m01
Module coordinator		Module offered by
Dean of Studies Mathematik (Mathematics)		Institute of Mathematics
ECTS	Method of grading	Only after succ. compl. of module(s)
10	numerical grade	--
Duration	Module level	Other prerequisites
2 semester	undergraduate	--
Contents		
<p>Topics in Group Theory (particularly finite abelian groups, normal subgroups, sub- and factorgroups, isomorphism theorems, solvability, group operations, Sylow theorems; examples: cyclic groups, alternating and symmetric groups, dihedral groups).</p> <p>Topics in ring theory (particularly ideals, divisibility, polynomial rings, irreducibility of polynomials).</p> <p>Topics in number theory (particularly Euclidean algorithm, Fermat's little theorem, Euler's theorem, Chinese remainder theorem, residue class rings and their unit groups, quadratic number rings).</p> <p>Topics in field theory (particularly algebraic field extensions, ruler and compass constructions, basics in Galois theory, solvability of equations, cyclotomic fields, finite fields).</p> <p>Applications of algebra and number theory (e.g., coding theory, cryptography, computer algebra).</p>		
Intended learning outcomes		
The student has extensive knowledge of the mathematical ways of thinking and working as well as of proof methods, so that he/she masters the basic notions of algebra and number theory and can apply them to elementary problems in other fields of mathematics.		
Courses (type, number of weekly contact hours, language — if other than German)		
V (4) + V (4) + Ü (2)		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
oral examination of one candidate each (20 to 40 minutes) Language of assessment: German and/or English Assessment will have reference to the contents of modules 10-M-ALGL und 10-M-AALL		
Allocation of places		
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Additional information		
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Workload		
300 h		
Teaching cycle		
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Referred to in LPO I (examination regulations for teaching-degree programmes)		
§ 73 I Nr. 2 (5 LP), § 73 I Nr. 5 (5 LP)		
Module appears in		
First state examination for the teaching degree Gymnasium Mathematics (2019) First state examination for the teaching degree Gymnasium Mathematics (2023)		

