Syllabus

Course Description

Course Title	Foundations of Subject-Specific Pedagogy I: Mathematics for Lower Secondary Education
Course Code	83016
Course Title Additional	
Scientific-Disciplinary Sector	STAT-04/A
Language	German
Degree Course	University course for initial training of secondary school teachers in the German language - 60CP
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. rer. nat. habil. Andreas Heinrich Hamel, Andreas.Hamel@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/33708
Teaching Assistant	
Semester	All semesters
Course Year/s	1
CP	2
Teaching Hours	12
Lab Hours	0
Individual Study Hours	39
Planned Office Hours	
Contents Summary	The module "Didactics of Mathematics" teaches basic subject-specific didactic skills for the planning, implementation and reflection of lessons in mathematics in secondary schools. The aim is to enable students to professionally design competence-oriented teaching for different learning groups at secondary levels I and II.
Course Topics	In this module, students explore the fundamentals of subject-specific pedagogy Mathematics and reflect on the interplay between subject-specific knowledge, curriculum guidelines and

	school practice. Building on this, they develop skills in competence-based lesson planning by analysing subject-specific competences, formulating learning objectives and structuring lesson plans. Principles of Experimental Mathematics will be tailor-made for designing mathematics lessons starting with hands-on experiments and leading to mathematical concepts, patterns and formulas. Topics include: - Numbers: from stripe, rectangular, square and triangular numbers to prime number concept and Gauss' formula - Geometric figures: from sewer manhole covers to minimal perimeter - Powers: from counting rice grains to binary representation of natural numbers - Comparisons: from forming pairs to ordering almost everything - Fractions and percentages: from dividing pizza and chocolate to calculus for fractions, percentages - Arrangement and permutations: from ball games to the permutation theorem for juggling patterns
Keywords	Subject Didactics Mathematics, experimental Mathematics, design of lessons, educational methods
Recommended Prerequisites	
Propaedeutic Courses	
Teaching Format	Interactive lectures with in-class experiments and discussions.
Mandatory Attendance	According to the degree programme regulations
Specific Educational Objectives and Learning Outcomes	Another focus is on the design of suitable learning settings and the methodological implementation. Students learn to use different forms of teaching and methods in a subject-specific way and to design learning processes in an active, differentiated and effective way for learning. Finally, the module deals with observing, giving feedback and evaluating learning processes and performance in mathematics. Forms of feedback that promote learning as well as criteria for transparent and competence-oriented performance assessment are discussed.
Specific Educational Objectives and Learning	Knowledge and understanding: understand the experimental approach to teaching mathematics

Outcomes (additional info.)	Applying knowledge and understanding: ability to design mathematics lesson starting with hands-on experiments or games and leading to mathematical concepts, structures, formulas. Communications: skill to moderate the cycle "formulate question -> experiment -> pattern/formula -> new question" in class while keeping attention and curiosity of students Learning to learn: skill to transfer the cycle "formulate question -> experiment -> pattern/formula -> new question" to new topics
Assessment	Written exam of 60 minutes
Evaluation Criteria	Correctness of answers, appropriate argumentation.
Required Readings	S. Lerman (editor) Encyclopedia of Mathematics Education, Springer Publishers 2014 (selected topics, material will be provided in class)
Supplementary Readings	T. Leuders (editor), Mathematik-Didaktik, Cornelsen, 6. edition 2011
Further Information	
Sustainable Development Goals (SDGs)	Quality education