

Syllabus

Descrizione corso

Titolo insegnamento	Fondamenti della didattica disciplinare I: discipline matematiche-tecniche nella scuola sec. II grado
Codice insegnamento	83020
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	STAT-04/A
Lingua	Tedesco
Corso di Studio	Percorso universitario di formazione iniziale dei docenti della scuola secondaria di primo e secondo grado in lingua tedesca - 60CP
Altri Corsi di Studio (mutuati)	
Docenti	Prof. Dr. rer. nat. habil. Andreas Heinrich Hamel, Andreas.Hamel@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/33708
Assistente	
Semestre	Tutti i semestri
Anno/i di corso	1
CFU	2
Ore didattica frontale	12
Ore di laboratorio	0
Ore di studio individuale	38
Ore di ricevimento previste	
Sintesi contenuti	The module "Didactics of Mathematics" teaches basic subject-specific didactic skills for the planning, implementation and reflection of lessons in mathematics. The aim is to enable students to professionally design competence-oriented teaching for different learning groups in secondary schools I and II.
Argomenti dell'insegnamento	In the module, students deal with the basics of mathematics didactics and reflect on the interplay between subject science,

	<p>curricular requirements and school practice. Building on this, they acquire skills in competence-oriented lesson planning by analysing subject-specific competences, formulating learning objectives and planning teaching units in a structured way.</p> <p>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.</p> <p>Principles of experimental mathematics are appropriately used to design mathematics instruction, beginning with hands-on experiments that lead to mathematical concepts, patterns, and formulas. Topics include:</p> <ul style="list-style-type: none"> - Fibonacci numbers and Newton methods (derivatives, tangents, recursions to the solution of equations) - Geometric figures and area vs. circumference (irrational and transcendental numbers, trigonometric functions, extreme value problems) - Betting, insurance, risk and uncertainty (probability, expected value, quantiles, decision-making under risk and uncertainty) - Bedford's Law, falsifications and logarithms (data collection, Fibonacci numbers again, probability distributions) - Order relations, rankings and indicators (complete vs. non-complete orders, sports results, grades, HDI, monotony characteristics) - Axioms, deduction and (un)logic (simple axiomatic systems, recursive reasoning, facts vs. fake news, dynamical systems)
Parole chiave	Subject Didactics Mathematics, experimental Mathematics, design of lessons, educational methods
Prerequisiti	
Insegnamenti propedeutici	
Modalità di insegnamento	Interactive lectures with in-class experiments and discussions.
Obbligo di frequenza	According to the degree programme regulations
Obiettivi formativi specifici e risultati di apprendimento attesi	<p>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</p>

	transparent and competence-oriented performance assessment are discussed.
Obiettivi formativi specifici e risultati di apprendimento attesi (ulteriori info.)	<p>Knowledge and understanding: understand the experimental approach to teaching mathematics</p> <p>Applying knowledge and understanding: ability to design mathematics lesson starting with hands-on experiments or games and leading to mathematical concepts, structures, formulas.</p> <p>Communications: skill to moderate the cycle "formulate question -> experiment -> pattern/formula -> new question" in class while keeping attention and curiosity of students</p> <p>Learning to learn: skill to transfer the cycle "formulate question -> experiment -> pattern/formula -> new question" to new topics</p>
Modalità di esame	Written exam of 60 minutes
Criteri di valutazione	Correctness of answers, appropriate argumentation.
Bibliografia obbligatoria	S. Lerman (editor) Encyclopedia of Mathematics Education, Springer Publishers 2014 (selected topics, material will be provided in class)
Bibliografia facoltativa	T. Leuders (editor), Mathematik-Didaktik, Cornelsen, 6. edition 2011
Altre informazioni	
Obiettivi di Sviluppo Sostenibile (SDGs)	Istruzione di qualità