Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Didactics of Physics
Code der Lehrveranstaltung	82047
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	PHYS-06/B
Sprache	Italienisch
Studiengang	Universitärer Lehrgang für die Grundausbildung der Lehrpersonen für die Mittel- und Oberschule in italienischer Sprache - 60KP
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Prof. a contratto dr. Leonardo Colletti, Leonardo.Colletti@unibz.it https://www.unibz.it/en/faculties/education/academic-staff/person/3425
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Zweites Semester
Studienjahr/e	1
KP	2
Vorlesungsstunden	18
Laboratoriumsstunden	0
Stunden für individuelles Studium	57
Vorgesehene Sprechzeiten	0
Inhaltsangabe	Main physics topics in the curriculum
Themen der Lehrveranstaltung	The course addresses the theoretical, epistemological, and methodological foundations of teaching physics in upper secondary school, with particular reference to academic-track high schools. A central axis of the course is the reflection on the dual nature of

	physics: on the one hand as a method of inquiry into reality, based on modeling, formalization, and empirical verification; on the other as an essential component of scientific culture, in dialogue with history, philosophy, and other disciplines. This perspective informs instructional choices and the design of learning pathways in the different high school tracks. The topics covered include: Foundations of discipline-specific physics education and the main teaching–learning models. Elements of epistemology and history of physics relevant for teaching. Main findings of research in physics education, with particular reference to the study of students' spontaneous conceptions and their development. Established tools and results will be discussed, such as the Force Concept Inventory and other conceptual assessments, as well as relevant contributions from international research (for example, those of Carl Wieman on active learning and the effectiveness of interactive methodologies). Analysis of learning difficulties and of the main student misconceptions across different areas of physics. Didactic transposition of the contents of classical physics (mechanics, thermodynamics, electromagnetism, optics) and modern physics (relativity, quantum mechanics). Comparison of different teaching approaches: transmissive, constructivist, inquiry-based, and problem-based learning. The role of language in physics: conscious use of scientific language, transition from everyday language to formal language, and acquisition of figurative language (models, analogies, metaphors) as cognitive tools. The role of representations (graphs, models, mathematization) in learning processes. Assessment of learning: functions (diagnostic, formative, summative), tools, and criteria. Reflection on the school system and on the role of physics in the different high school tracks: differences in aims, levels of formalization required, and the educational meaning of the discipline in different contexts.

	Physics as method and physics as culture: implications for teaching, for content selection, and for the design of interdisciplinary pathways.
Stichwörter	didactic transposition; culture of physics; didactic choice; didactic methodology
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	
Unterrichtsform	The course is carried out through: Interactive lectures, with ample space for discussion. Analysis of case studies and teaching practices. Reading and commentary on research articles in physics education. Individual and group reflection activities on topics such as assessment, the role of the discipline, and curricular choices. Guided discussions on epistemological and cultural issues (for example: what it means to "understand" physics in different school contexts). While maintaining a theoretical framework, the course includes applied components aimed at connecting didactic models with teaching practice and the real school context.
Anwesenheitspflicht	In accordance with the regulation
Spezifische Bildungsziele und erwartete Lernergebnisse	Developing physics-specific teaching skills Promoting critical reflection on the discipline Integrate innovative technologies and methodologies Promote active learning and scientific enquiry Effectively assess student learning Knowledge Know the main theories and models of physics taught in school. Understand the epistemological foundations of the discipline, including the processes of modelling and experimentation. To be familiar with the results of research in physics education. To be familiar with ministerial and provincial guidelines relating to the teaching of physics in schools.

	Skills Design effective learning units, consistent with the curricula and based on measurable objectives. Identify and manage conceptual nodes and students' cognitive difficulties. Develop effective formative and summative assessment tools. Competences To be able to teach physics in a conceptually sound and didactically effective manner. To be able to critically reflect on one's teaching practice and improve it based on observation and feedback. To promote scientific competences in students, such as critical thinking, argumentation, modelling and experimentation. Adapt one's teaching to different starting levels and cognitive styles of the students.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	---
Art der Prüfung	---
Bewertungskriterien	----
Pflichtliteratur	----
Weiterführende Literatur	----
Weitere Informationen	----
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung