

4.00 credits









22.5 h + 7.5 h

Q1

Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	The knowledge of the discipline to be taught, i.e., the physics content related to the 2nd level of secondary education in general sciences.
Main themes	<ul style="list-style-type: none"> <li>· Programs and standards</li> <li>· Science resources (textbooks, digital tools, educational kits)</li> <li>· The didactic triangle: teaching and learning</li> <li>· Didactic transposition and desyncrretization</li> <li>· Initial conceptions and epistemological obstacles</li> <li>· The value and use of experimental activities</li> <li>· Didactic specificities of a physics teaching sequence at the 2nd level (D2)</li> <li>· Problematization and modeling in D2</li> <li>· The epistemology of physics</li> <li>· Assessment of learning</li> <li>· Concepts that are challenging to teach in physics at D2</li> </ul>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p><b><u>At the end of this teaching unit, the student will be able to:</u></b></p> <ul style="list-style-type: none"> <li>· Apply disciplinary didactics and epistemology to guide pedagogical actions in physics courses for the 2nd degree.</li> <li>· Transform scholarly knowledge into teachable content for physics education at the 2nd degree.</li> <li>· Design and plan teaching-learning (TL) situations in three stages (contextualization, decontextualization, and recontextualization) tailored to the students' needs and aligned with competency frameworks and curricula.</li> <li>· Demonstrate mastery of new disciplinary and interdisciplinary knowledge relevant to the curriculum.</li> </ul> <p>1</p> <ul style="list-style-type: none"> <li>· Explore innovative disciplinary, interdisciplinary, and technological pedagogical approaches and tools, such as textbooks, digital tools, and teaching kits.</li> <li>· Design, conduct, and evaluate experimental teaching sequences.</li> <li>· Reflect on and challenge their own initial representations and conceptions to foster personal growth.</li> <li>· Identify students' initial spontaneous representations and conceptions, integrating and evolving them within a teaching sequence.</li> <li>· Adopt a reflective attitude toward their teaching practices, grounded in didactic and pedagogical principles as well as insights from educational research.</li> </ul> <p><b><u>Contribution of the Teaching Unit to the Programme's AA Competency Framework</u></b></p> <p>This teaching unit contributes to the development and acquisition of the following competencies, aligned with the initial training program for physics teachers:</p> <p><b>AA3: Skills in organizing and supporting learning within a dynamic and evolving framework.</b></p> <p>2</p> <ul style="list-style-type: none"> <li>• AA.3.1: Mastering disciplinary content, its epistemological foundations, its scientific and technological developments, as well as its didactics and teaching methodology.</li> <li>• AA.3.2: Understanding learning processes and the research underpinning various teaching models and theories.</li> </ul>

	<ul style="list-style-type: none"> <li>• AA.3.5: Acting as a collaborative educator within the classroom and school environment by:             <ul style="list-style-type: none"> <li>• AA.3.5.1: Designing and implementing diverse teaching approaches to strengthen students' motivation, self-confidence, creativity, initiative, and collaboration.</li> <li>• AA.3.5.2: Selecting, designing, and utilizing teaching materials, textbooks, digital tools, and other educational resources.</li> <li>• AA.3.5.3: Creating and applying observation and evaluation tools, emphasizing formative and comprehensive assessment to foster student responsibility and engagement in their learning process.</li> <li>• AA.3.5.4: Developing and implementing differentiated teaching practices and personalized student support, taking into account prior achievements, individual learning profiles, and, when necessary, specific needs—leveraging co-teaching or collaborative pedagogical strategies.</li> <li>• AA.3.5.5: Promoting interdisciplinary learning through the development of integrated activities.</li> </ul> </li> <li>• AA.3.6: Integrating digital technologies effectively into teaching practices.</li> <li>• AA.3.7: Addressing cross-cutting themes, including media literacy, EVRAS (education for relational, emotional, and sexual life), and gender equality.</li> <li>• AA.3.8: Establishing a supportive relational framework to foster communication with students, their families, and colleagues.</li> <li>• AA.3.9: Managing classroom dynamics in a manner that is educationally stimulating, structurally sound, and emotionally reassuring.</li> </ul> <p><b>AA4: Reflective Practitioner Skills</b></p> <ul style="list-style-type: none"> <li>• AA.4.1: Critically analyze the results of scientific research in education and didactics, drawing inspiration from these findings to inform and enhance teaching practices. Leverage insights from various disciplines within the human sciences to evaluate and act effectively in professional situations.</li> <li>• AA.4.2: Engage in critical and rigorous observation and analysis of one's own teaching practices—both individually and collaboratively with peers. Assess the impact of these practices on students to adapt and improve teaching strategies and conditions, ensuring greater efficiency and equity.</li> </ul>
<p>Evaluation methods</p>	<p>Students enrolled in the course unit <b>LPHYS2320C</b> are assessed as follows:</p> <ul style="list-style-type: none"> <li>• <b>Activity 1:</b> Daily activities – 20% of the final grade</li> <li>• <b>Activity 2:</b> Observation placement report (10 hours in physics) – 30% of the final grade</li> <li>• <b>Activity 3:</b> Individual written examination (January), covering concepts in physics didactics and epistemology at the D2 level – 50% of the final grade</li> </ul> <p>Each of these activities must be passed with a minimum mark of <b>10/20</b> in order to pass the course. The principle of the <i>absorbing grade</i> applies to this course unit.</p> <p>Attendance is compulsory. In accordance with <b>Article 72 of the General Regulations for Studies and Examinations</b>, the course instructor may propose to the jury that a student who has not attended at least <b>80% of the sessions</b> be denied registration for the January, June, or September examination sessions.</p>
<p>Teaching methods</p>	<p>The teaching activities are those recommended in secondary education: group work, lectures, flipped classrooms, practical work, laboratory sessions, etc. The didactic approach emphasizes co-construction with the students.</p>
<p>Content</p>	<p>This teaching unit is designed to <b>equip students to become future physics teachers at the lower and upper secondary levels (D2)</b>. It aims not only to present didactical aspects related to the teaching of physics in D2, but also to ensure the transfer and appropriation of these tools by future teachers through lesson planning and preparation.</p> <ul style="list-style-type: none"> <li>• The importance of epistemology; major epistemological perspectives</li> <li>• Key concepts and physical theories</li> <li>• Didactical specificities of a physics teaching sequence</li> <li>• Experimentation, the scientific approach, and inquiry-based learning in physics</li> <li>• Conceptualization in physics</li> <li>• Concepts that are particularly difficult to teach in physics</li> <li>• Assessment of learning in physics</li> </ul>
<p>Inline resources</p>	<p>On Moodle UCLouvain, course code LPHYS2320.</p> <p>The platform contains the documents presented and used during the lectures, and it also provides a space for students to submit their assignments.</p>
<p>Bibliography</p>	<p>Des ouvrages et publications scientifiques en relation avec les disciplines enseignées et avec la didactique seront présentés lors des cours.</p>

Other infos	The course <b>LPHYS2320C [Q1]</b> is an elective course open to students enrolled in the <b>Master [120] in Teaching, Section 4</b> and the <b>Master [60] in Teaching, Section 5</b> in mathematics, engineering sciences and geography. It focuses exclusively on the content of lower secondary education (D2) in physics and includes an observation placement. The course also comprises a joint component with <b>LCHM2320A, LBIO2320A, and LPHYS2320A</b> , covering science didactics (the first 9 hours).
Faculty or entity in charge	SC

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Teacher Training Certificate (upper secondary education) - Mathematics	MATH2A	4		
Teacher Training Certificate (upper secondary education) - Geography	GEO2A	4		
Teacher Training Certificate (upper secondary education) - Biology	BIOL2A	4		
Teacher Training Certificate (upper secondary education) - Chemistry	CHIM2A	4		
Master [60] of Education, Section 5 : Engineering	DSIR2M5	4		
Master [120] of Education, Section 4 : Geography	GEOG2M4	4		
Master [60] of Education, Section 5 : Geography	GEOG2M5	4		
Master [120] of Education, Section 4 : Mathematics	MATH2M4	4		
Master [60] of Education, Section 5 : Mathematics	MATH2M5	4		