UCLouvain

lphys1346

2026

Physique subatomique

5.00 credits	26.0 h + 26.0 h	Q2

Teacher(s)	Delaere Christophe ;
Language :	French
Place of the course	Louvain-la-Neuve
Learning outcomes	
Evaluation methods	The evaluation takes the form of an oral examination, preceded by preparation time. Part of the final grade will come from compulsory work in the laboratories, which will be presented during the term and cannot be produced subsequently in the event of a second session. The score associated with the laboratories will account for 10% of the final score.
Teaching methods	Learning activities include lectures, exercises and practical work. The lectures aim to introduce the fundamental concepts, to motivate them by presenting examples and establishing results, to show their reciprocal links and their relationships with the different parties associated with this teaching unit, and to establish links with the rest of the teaching units of the bachelor's degree in physical sciences. The practical work sessions aim to learn how to use the ideas and formalism developed in subatomic physics in order to explain the results of experiments carried out in laboratory sessions or described as part of the lecture. The practical work carried out during sessions of specific practical work or descriptions of past experiences aims to provide an introduction to experimental methods in these disciplines and to validate the theoretical notions seen during or the establishment of theoretical notions following the observation made in the laboratory.
Content	1. Basic concepts • Brief history of nuclear and particle physics • Relativity and antiparticles • Spatio-temporal symmetries and conservation laws • Feynman interactions and diagrams • Particle exchange: forces and potentials • Observable quantities: cross sections and decay rate 2. Phenomenology in nuclear physics • Mass spectroscopy • Nuclear shapes and sizes • Semi-empirical mass formula: the liquid drop model • Nuclear instability • Disintegration chains • Phenomenology of disintegration # • Fission • Disintegration # • Nuclear reactions 3. Phenomenology in particle physics • Leptons • Quarks • Hadrons
Inline resources	Different resources (slides and supporting documents) are put online via the MoodleUCL platform.
Bibliography	Brian R. Martin, Graham Shaw, "Nuclear and Particle Physics: An Introduction", 3rd Edition, ISBN: 978-1-119-34461-2. K. S. Krane, "Introductory Nuclear Physics", 3rd edition, ISBN: 978-0-471-80553-3.
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Minor in Physics	MINPHYS	5		🔍
Master [120] in Physical Engineering	FYAP2M	5		🔍
Bachelor in Physics	PHYS1BA	5		🔍