

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

4 credits

30.0 h + 15.0 h

Q2

Teacher(s)	G�rard Jean-Marc ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	Depending on the audience's interests, the course introduces to some of the important ideas of physics, to be chosen from among Newton's mechanics, Maxwell's electromagnetism, Einstein's theories of special and general relativity, quantum physics, the physics of condensed matter or the theories of the elementary particles. It concludes with some of the challenges left unanswered by modern physics. No detailed mathematical formulation is developed. Rather, emphasis is put throughout on a discussion of the basic concepts and their actual significance. Applications of these fundamental sciences to advanced modern technologies are also highlighted.
Aims	<p>The fundamental natural sciences, and especially physics, are as much part of the common cultural heritage of humankind as are the arts and the humanities understood in the broadest terms. Indeed, within its specific methodology physics itself attempts to grasp the basic meaning of the Universe and Man's place within it. From the perspective of an exposure to the general culture of science offered to students in the humanities, with only little use of the mathematical language the course discusses the basic and essential significance of the concepts underlying the "revolutions" of physics having led to modern physics. Some common advanced technologies stemming from these advances are also described. The course closes with some of the open challenges of which the possible resolutions will define the physics of the XXIst century.</p> <p>-----</p> <p><i>The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".</i></p>
Evaluation methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> The student will submit a personal work to present during the oral examination.
Teaching methods	<b>Due to the COVID-19 crisis, the information in this section is particularly likely to change.</b> This course will be fully presented on a blackboard. Notes are under construction but references such as <ul style="list-style-type: none"> <li>• <i>La nature de la physique</i> (R. Feynman)</li> <li>• <i>Sept br�ves le�ons de physique</i> (C. Rovelli)</li> </ul> will be given according to the themes addressed.
Content	<p>Introduction to the great ideas of modern physics, from the universal gravity of Newton (1686) to the discovery of the Higgs particle (2012).</p> <p>According to Galileo, philosophy is written in this immense book which continually remains open in front of our eyes (this book being the Universe), but we cannot understand it if, first, we do not practice knowing its language and the characters in which it is written. It is written in mathematical language, and its characters are triangles, circles, and other geometric figures without which it is humanly impossible to grasp a single word; without these means, we risk getting lost in a dark labyrinth ...</p> <p>Adopting this point of view, the course is based on</p> <ul style="list-style-type: none"> <li>- Newton's constant G (gravitation)</li> <li>- the speed of light c (special relativity)</li> <li>- Planck's constant h (quantum mechanics)</li> </ul> <p>to describe and explain the major concepts of modern physics in terms of trigonometric circles, pseudo-circles and imaginary circles, respectively.</p> <p>These three universal constants are then combined to overview recent developments in cosmology (G + c), particle physics (c + h) and unified theories (G + c + h).</p>
Other infos	Prerequisites: Basic physics and mathematics concepts at the high school level.

Faculty or entity in charge	PHYS
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<b>Programmes containing this learning unit (UE)</b>				
Program title	Acronym	Credits	Prerequisite	Aims
Minor in Scientific Culture	<a href="#">MINCULTS</a>	4		