

6.0 credits	45.0 h + 30.0 h	1 + 2q
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Teacher(s) :	Gilon Patrick ; Delbar Thierry ; Morsomme Pierre ; Cornet Alain ; Rees Jean-François (coordinator) ;
Language :	Français
Place of the course	Louvain-la-Neuve
Aims :	<p>The course aims at analyzing fundamental biological questions by means of physics. It follows the courses of physics and biology in BAC1. During this course, these disciplines will be integrated in order to analyze fundamental biological questions focused on the interactions of the living cell with its physical environment and on the physical laws governing the physiology of cells. The aim of this course is to understand important physical concepts, while integrating them in the living world. It will establish the link between Biology and Physics, showing the relevance of Physics in the analysis and the comprehension of biological phenomena.</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>
Content :	<p>In the first part BIO1261D, the course will cover the following concepts:</p> <ol style="list-style-type: none"> 1. Electromagnetic radiations and their biological effects; Maxwell's equations; Electromagnetic waves: classification and characteristics; Physical properties of light; Photons and visual systems; Ocular optics; use of the light in the analysis of biological phenomena; Sound waves and hearing; Nature of sound waves; Hearing systems; Middle and inner ear; Physiology of the ciliated cell; Nuclear physics and living organisms; Nature and properties of radioactive elements; Method of detection and quantification; Effects of radiations on living tissues; Use of radioactive elements in biology and medicine. 2. Mechanisms of transport: Transport of molecules across biological membranes; Diffusion; Osmosis and osmotic pressure; 3. Biological electricity: Electric properties of membranes; Equilibrium potential; Nernst equation; resting membrane potential; Goldman equation; Action potential; Ionic bases of the action potential; Ionic channels; Propagation in excitable cells; Measurement techniques of membrane electric phenomena. <p>In the second part BIO1261E, the students will be confronted with situations-problems. The teachers will ask specific biological questions and the students will have to answer them by using notions in physics. The students will have to search information in their notes, publications or books, and during visits in various laboratories in order to make a summary and a final oral presentation.</p>
Faculty or entity in charge:	BIOL