


5.00 credits

40.0 h + 20.0 h

Q2

Teacher(s)	Bruno Giacomo ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	<p>The course is divided into three parts. The first covers the mechanics of points and simple systems. After an initial kinematic study of movements, Newtonian principles are introduced, the basic concepts of impulsion, quantity of movement, work, energy and power, and the principle of energy conservation. Within a systems dynamics framework, collisions and rotations of rigid bodies are investigated, introducing the concepts of moment of force and kinetic moment. These various concepts will be applied to the study of oscillating motion, simple oscillating systems and harmonic oscillation, the simple pendulum and gravitation. This part ends in an introduction to fluid mechanics and the laws of gases. The second part introduces wave physics (mechanical and sound waves) and demonstrates some specific properties like the Doppler effect, interference and diffraction. The last part deals with modern Physics, highlighting the contribution of restricted relativity and quantum Physics to our understanding of the structure of matter and basic interactions, and of the birth and development of the universe. The course also introduces students to experimentation in Physics, focused on determining the orders of magnitude in simple mechanical systems</p>
Learning outcomes	<p><b>At the end of this learning unit, the student is able to :</b></p> <p>At the end of this teaching unit the student is able to :</p> <ul style="list-style-type: none"> <li>• Reason scientifically.</li> <li>• Communicate in a scientific manner, that is to say without ambiguities and without leaving anything to subjective interpretation.</li> </ul> <p><sup>1</sup></p> <ul style="list-style-type: none"> <li>• Apply fundamental principles to various concrete situations.</li> <li>• Understand the dynamics of simple mechanical and thermodynamical systems and model such systems.</li> <li>• Quantitatively solve problems involving simple mechanical and thermodynamical systems</li> <li>• Estimate the value of quantities</li> </ul>
Evaluation methods	Written exam with multiple-choice questions. Some questions relate to the laboratory sessions held during the year.
Teaching methods	Lectures in class backed up by practical demonstrations. Exercise sessions where problems are solved. Certain aspects of the course will be studied wholly or in more detail in the laboratory.
Content	Introduction to physics - Measurements and associated uncertainties - Vectors - Kinematics - Dynamics of the material point - Oscillating motion - Energy and power - Conservation laws - Gravitation - Dynamics of multi-body systems - Dynamics of the rigid body - Physics of fluids - Heat - Temperature - Laws of gases - Entropy - Introduction to mechanical waves - General characteristics of waves - Stationary and progressive waves - Sound waves - Doppler effect - Interference and diffraction - Introduction to modern physics Restricted relativity and basic concepts of quantum physics
Other infos	Course materials: BENSON Harris, Physics. Mechanical Volume 1 and Volume 3 Waves-Optical and modern Physics, French Translation, De Boeck Université. Students wishing to improve their English would do well to use the English version of this work.
Faculty or entity in charge	ESPO

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Minor in Scientific Culture	<a href="#">MINCULTS</a>	5		
Bachelor : Business Engineering	<a href="#">INGE1BA</a>	5		