



LPHY1121
2015-2016



General physics I - 1st part

6.0 credits	30.0 h + 41.5 h	1q
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Teacher(s) :	Fichetef Thierry ;
Language :	Français
Place of the course	Louvain-la-Neuve
Inline resources:	MoodleUCL LPHY1121
Prerequisites :	It is assumed that the student (1) has a sufficient knowledge of French to enable him or her to follow or conduct a structured discussion without ambiguity, whether orally or in writing, (2) understands basic mathematical analysis tools such as linear algebra, geometry, trigonometry, and differential and integral calculus and (3) is familiar with , including three-dimensional ones. Unit LPHY1121 is a prerequisite for unit LPHY1122.
Main themes :	This unit will present the fundamental concepts of classical mechanics and, more particularly, the mechanics of a material point and rigid bodies for use in the fields of biology, chemistry and geography. The following main themes will be addressed: kinematics, dynamics, the principles of conservation and the mechanics of rigid bodies.
Aims :	& mp;amp;amp;amp;lt;!--{cke_protected}{C}%3C!%2D%2D%0A%20%2F*%20Font%20Definitions%20%2F%0A%40font-face%0A%09%7Bfont-family%3AArial%3B%0A%09panose-1%3A2%2011%206%204%202%202%202%202%202%204%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aauto%3B%0A%09mso-font-pitch%3Avariable%3B%0A%09mso-font-signature%3A-536859905%20-1073711037%209%200%20511%200%3B%7D%0A%40font-face%0A%09%7Bfont-family%3A%22Cambria%20Math%22%3B%0A%09panose-1%3A2%204%205%203%205%204%206%203%202%204%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aauto%3B%0A%09mso-font-pitch%3Avariable%3B%0A%09mso-font-signature%3A3%200%200%201%200%3B%7D%0A%40font-face%0A%09%7Bfont-family%3ACalibri%3B%0A%09panose-1%3A2%2015%205%202%202%202%204%203%202%204%3B%0A%09mso-font-charset%3A0%3B%0A%09mso-generic-font-family%3Aauto%3B%0A%09mso-font-pitch%3Avariable%3B%0A%09mso-font-signature%3A-520092929%201073786111%209%200%20415%200%3B%7D%0A%20%2F*%20Style%20Definitions%20*%2F%0Ap.MsoNormal%2C%20li.MsoNormal%2C%20div.MsoNormal%0A%09%7Bmso-style-unhide%3Ano%3B%0A%09mso-style-qformat%3Ayes%3B%0A%09mso-style-parent%3A%22%22%3B%0A%09margin-top%3A0cm%3B%0A%09margin-right%3A0cm%3B%0A%09margin-bottom%3A10.0pt%3B%0A%09margin-left%3A0cm%3B%0A%09line-height%3A115%25%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A11.0pt%3B%0A%09font-family%3ACalibri%3B%0A%09mso-ascii-font-family%3ACalibri%3B%0A%09mso-ascii-theme-font%3Aminor-latin%3B%0A%09mso-fareast-font-family%3ACalibri%3B%0A%09mso-fareast-theme-font%3Aminor-latin%3B%0A%09mso-hansi-font-family%3ACalibri%3B%0A%09mso-hansi-theme-font%3Aminor-latin%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-bidi-theme-font%3Aminor-bidi%3B%0A%09mso-ansi-language%3AFR-BE%3B%0A%09mso-fareast-language%3AEN-US%3B%7D%0A%09%7Bmso-style-noshow%3Ayes%3B%0A%09mso-style-priority%3A99%3B%0A%09mso-margin-top-alt%3Aauto%3B%0A%09margin-right%3A0cm%3B%0A%09mso-margin-bottom-alt%3Aauto%3B%0A%09margin-left%3A0cm%3B%0A%09mso-pagination%3Awidow-orphan%3B%0A%09font-size%3A12.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-fareast-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-ansi-language%3AFR%3B%7D%0A.MsoChpDefault%0A%09%7Bmso-style-type%3Aexport-only%3B%0A%09mso-default-props%3Ayes%3B%0A%09font-size%3A11.0pt%3B%0A%09mso-ansi-font-size%3A11.0pt%3B%0A%09font-family%3ACalibri%3B%0A%09mso-ascii-font-family%3ACalibri%3B%0A%09mso-ascii-theme-font%3Aminor-latin%3B%0A%09mso-fareast-font-family%3ACalibri%3B%0A%09mso-fareast-theme-font%3Aminor-latin%3B%0A%09mso-hansi-font-family%3ACalibri%3B%0A%09mso-hansi-theme-font%3Aminor-latin%3B%0A%09mso-bidi-font-family%3A%22Times%20New%20Roman%22%3B%0A%09mso-bidi-theme-font%3Aminor-bid%3B%0A%09mso-fareast-language%3AEN-US%3B%7D%0A.MsoPapDefault%0A%09%7Bmso-style-type%3Aexport-only%3B%0A%09margin-bottom%3A10.0pt%3B%0A%09line-height%3A115%25%3B%7D%0A%40page%20WordSection1%0A%09%7Bsize%3A612.0pt%20792.0pt%3B%0A%09margin%3A70.85pt%2070.85pt%2070.85pt%2070.85pt%3B%0A%09mso-header-margin%3A36.0pt%3B%0A%09mso-footer-margin%3A36.0pt%3B%0A%09mso-paper-source%3A0%3B%7D%0Adiv.WordSection1%0A%09%7Bpage%3AWordSection1%3B%7D%0A%20%2F*%20List%20Definitions%20*%2F%0A%40list%2010%0A%09%7Bmso-list-id%3A411437872%3B%0A%09mso-list-type%3Ahybrid%3B%0A%09mso-list-template-ids%3A697990560%2067895321%2067895321%2067895323%2067895311%2067895323%2067895311%2067895321%2067895321%2067895321%2010%3Alevel1%0A%09%7Bmso-level-number-format%3Alpha-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%2010%3Alevel2%0A%09%7Bmso-level-number-format%3Alpha-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%2010%3Alevel3%0A%09%7Bmso-level-number-format%3Aroman-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aright%3B%0A%09text-indent%3A-9.0pt%3B%7D%0A%40list%2010%3Alevel4%0A%09%7Bmso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%2010%3Alevel5%0A%09%7Bmso-level-number-format%3Alpha-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%2010%3Alevel6%0A

	<p>%09%7Bmso-level-number-format%3Aroman-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aright%3B%0A%09text-indent%3A-9.0pt%3B%7D%0A%40list%20I%3Alevel%7%0A%09%7Bmso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%20I%3Alevel%8%0A%09%7Bmso-level-number-format%3Aalpha-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%7D%0A%40list%20I%3Alevel%9%0A%09%7Bmso-level-number-format%3Aroman-lower%3B%0A%09mso-level-tab-stop%3Anone%3B%0A%09mso-level-number-position%3Aright%3B%0A%09text-indent%3A-9.0pt%3B%7D%0A%40list%20I%3Alevel%7%0A%09%7Bmso-list-id%3A1295985808%3B%0A%09mso-list-type%3Ahybrid%3B%0A%09mso-list-template-ids%3A-1214091334%2067895297%201104941646%202113407758%201900417458%201348228622%20-964886734%20-787873%20%201499%7D%0A%40list%20I%3Alevel%1%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AEF%82%B7%3B%0A%09mso-level-tab-stop%3A36.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3ASymbol%3B%7D%0A%40list%20I%3Alevel%2%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A72.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%3%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A108.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%4%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A144.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%5%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A180.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%6%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A216.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%7%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A252.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%8%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A288.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%40list%20I%3Alevel%9%0A%09%7Bmso-level-number-format%3Abullet%3B%0A%09mso-level-text%3AE2%80%93%3B%0A%09mso-level-tab-stop%3A324.0pt%3B%0A%09mso-level-number-position%3Aleft%3B%0A%09text-indent%3A-18.0pt%3B%0A%09font-family%3A%22Times%20New%20Roman%22%3B%7D%0A%09%7Bmargin-bottom%3A0cm%3B%7D%0Aul%0A%09%7Bmargin-bottom%3A0cm%3B%7D%0A%2D%2D%3E--& mp; amp; amp; amp; gt;</p> <p>a. Course contribution to the LO reference framework for the programme BIOL1BA: 1.2 (D, E), 1.3 (S), 3.1 (S), 3.2 (S), 3.4 (S), 4.2 (D), 4.4 (D), 5.1 (S), 5.3 (S), 7.3 (S). CHIM1BA: 1.1 (D, E), 2.1 (D, E), 3.3 (D, E), 4.1 (S), 4.2 (S), 4.3 (S), 5.3 (D), 5.4 (D, E). GEOG1B: 1.1 (D, E), 3.2 (S), 3.6 (S), 7.2 (D, E), 7.3 (D, E).</p> <p>b. Specific formulation for this course At the end of this teaching unit, the student will be able to: handle the basic mathematical analysis tools of physics; understand the fundamental laws of classical mechanics; convert a literal statement for classical mechanics into mathematical equations and vice versa; represent the behaviour of a simple physics system using a mathematical model and assess the latter's validity; apply physical theories to solve a simple problem of classical mechanics and identify relevant and non-relevant data; argue in relation to the validity of a classical mechanics result; carry out a simple classical mechanics experiment and analyse its results, in the light of the theoretical reference framework, taking into account different sources of possible errors; explain and justify the choice of a method of measurement in physics and apply it with a view to obtaining a result; transpose the theoretical concepts from classical mechanics to concrete problems related to biology, chemistry or geography. <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>
<p>Evaluation methods :</p>	<p>A test on the subjects studied during the first four weeks will take place at the end of the fifth week. It will count for 5% of the final grade. This test will be corrected during a remedial class organised in week six. Laboratory reports will count for 15% of the final grade. The exam in the January session (and in the other sessions) will be written, last four hours and count for 80% of the final grade.</p> <p>The test and exam will include various problems similar to those solved in the supervised exercise sessions (in the exam, one of these problems will be taken from the list of problems solved in the sessions) and some questions whose aim is to confirm that the concepts and developments presented during the theoretical course have been well absorbed (comprehension questions, demonstrations, true or false with or without justification, multiple-choice questions or gap-filling exercises).</p> <p>Everything studied during the theoretical lessons and supervised exercise sessions should be known for the test and exam. However, the students will have access to a form with the main formulas, which is posted on the UCL LPHY1121 Moodle site. Students must have a simple scientific calculator for both assessments.</p>

Teaching methods :	<p>The teaching activities comprise (1) the theoretical course (two hours per week, except in week six), (2) a remedial session of two hours in week six, (3) supervised exercise sessions (15 sessions of two hours), (4) practical laboratory work (3 sessions of two hours) and (5) the tutorial. Students must have a simple scientific calculator in the supervised exercise sessions and the practical laboratory work.</p> <p>The entire topic will be presented in the theoretical course via slides and blackboard notes. The fundamental concepts will be illustrated using applications from modern life, short films/animations and experiments. The supervised exercises will play an essential role in the comprehension of the theoretical course and allow the application of theoretical concepts studied to real problems. The list of problems to be solved during the exercise session and a list of additional problems will appear on the UCL LPHY1121 Moodle site approximately one week prior to each exercise session. Preparation of the problems to be solved is obligatory. Participation in the practical laboratory sessions is obligatory. A description of the tasks to be carried out in the laboratory, as well as an introductory video, will appear on the UCL LPHY1121 Moodle site approximately one week prior to each session. It is essential that this description be read carefully, the video be watched and that the preliminary questions be answered prior to the session. A laboratory report must be written and submitted at the end of the session. It will be assessed. A tutorial, during which the students may ask their questions to the teaching team, will be organised each week. The best approach is to work consistently throughout the course. In particular, it is essential that students regularly solve the exercises themselves, and do not simply read the solutions.</p>
Content :	Introduction - Vectors - Kinematics in one dimension - Inertia and motion in two dimensions - Dynamics of a material point - Work and energy - Energy conservation - Momentum - Systems of particles - Rotation of a rigid body around a fixed axis - Static equilibrium and angular momentum - Oscillations.
Bibliography :	The slides and films/animations presented in the theoretical course, the list of exercises to be solved, the materials for practical work in the laboratory and other useful documents are available to the students on the UCL LPHY1121 Moodle site. The theoretical course closely follows the book 'Physique, 1. Mécanique, 5th edition' written by H. Benson and edited by De Boeck.
Faculty or entity in charge:	PHYS

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Bachelor in Biology	BIOL1BA	6	-	
Bachelor in Geography : General	GEOG1BA	6	-	
Bachelor in Chemistry	CHIM1BA	6	-	