UCLouvain

lphy1122

2017

General physics I - 2d part

6 credits	45.0 h + 33.5 h	Q2

Teacher(s)	Lauzin Clément ;Plumat Jim ;
Language :	French
Place of the course	Louvain-la-Neuve
Main themes	The content of the first part of the course will relate to the physics of liquids and deal with the following matters: hydrostatics - fluid dynamics - the macroscopic properties of gases - kinetic theory of gases - changes of state in a pure substance. The second part of the course, that concerns electricity and magnetism, deals with the following: Coulomb's law - electric fields and potential - Gauss' lemma - capacity and capacitors - electric fields in matter - Joule's and Ohm's laws - internal resistance - Kirchhoff's laws - measurement apparatus - capacitor loading and unloading - magnetic field - Ampère's law. The matters will be approached with a view to being used in the fields of biology, chemistry and geography in every sense.
Aims	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). b. Specific formulation for this course At the end of this teaching unit, the student will be able to: 1 • Handle the basic mathematical analysis tools of physics, • Understand the fundamental laws of fluid mechanics, thermodynamics and electricity, • Convert a literal statement in line with the topics studied into mathematical equations and vice versa, • Represent the behaviour of a simple physics system using a mathematical model and assess the latter's field of validity, • Apply physical theories to the solution of a simple problem of fluid mechanics, thermodynamics and electricity and identify relevant and non-relevant data, • Argue in relation to the validity of a physics result linked to the topics studied, • Carry out a simple physics experiment in connection with the topics studied and analyse his or her 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 linked to the topics studied into concrete problems relating to biology, chemistry or geography. - - - - *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".*
Evaluation methods	A test on the material seen during the first four weeks will take place at the end of the fifth week. It will count for 5% of the final grade. Laboratory reports will count for 15% of the final grade. The June session exam will be written, last four hours and count for 80% of the final grade. The test and the 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). Everything studied during the theoretical lessons and supervised exercise sessions should be known for the test and the exam. The students have access to the data on UCL's LPHY1122 Moodle site. Students must have a simple scientific calculator in both assessments.

Teaching methods	The teaching activities comprise (1) the theoretical course (two hours per week), (2) supervised exercise sessions (15 sessions of two hours), (3) practical laboratory work (4 sessions of two hours) and (4) the tutorial. Students must have a simple scientific calculator in the supervised exercise sessions and the practical laboratory work. The entire topic will be presented in the theoretical course via slides and blackboard notes. The fundamental concepts will be illustrated using applications to 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 LPHY1122 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 will appear on the UCL LPHY1122 Moodle site approximately one week prior to each session. It is essential that this description be read carefully and that the preliminary questions be answered prior to the session. A laboratory report must be written and at the end of the session and it will be assessed. One tutorial, during which the students may ask their questions to the teaching team, will be organised each week.
Content	The content of the first part of the course will relate to the physics of liquids and deal with the following matters: hydrostatics - fluid dynamics - the macroscopic properties of gases - kinetic theory of gases - changes of state in a pure substance. The second part of the course, that concerns electricity and magnetism, deals with the following: Coulomb's law - electric fields and potential - Gauss' lemma - capacity and capacitors - electric fields in matter - Joule's and Ohm's laws - internal resistance - Kirchhoff's laws - measurement apparatus - capacitor loading and unloading - magnetic field - Ampère's law. The matters will be approached with a view to being used in the fields of biology, chemistry and geography in every sense.
Bibliography	Les diapositives et les films/animations projetés au cours théorique, la liste des exercices à résoudre, les supports des travaux pratiques en laboratoire et d'autres documents utiles sont mis à disposition des étudiants sur le site Moodle UCL de LPHY1122. Le cours théorique suit assez fidèlement les livres « Physique, 1. Mécanique, $5^{ème}$ édition » et « Physique, 2 Electricité et Magnétisme, $5^{ème}$ édition » écrits par H. Benson et édité par De Boeck. D'autres références bibliographiques peuvent être demandées à l'enseignant.
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Bachelor in Chemistry	CHIM1BA	6		
Bachelor in Biology	BIOL1BA	6		
Bachelor in Geography : General	GEOG1BA	6		