UNIVERSITÀ DI PAVIA

Anno Accademico 2019/2020

PHYSICS	
Enrollment year	2019/2020
Academic year	2019/2020
Regulations	DM270
Academic discipline	FIS/01 (EXPERIMENTAL PHYSICS)
Department	DEPARTMENT OF DRUGS SCIENCES
Course	MEDICINAL CHEMISTRY AND PHARMACEUTICAL TECHNOLOGY
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	1st semester (01/10/2019 - 31/01/2020)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	GERACE DARIO (titolare) - 6 ECTS
Prerequisites	Good knowledge of elementary mathematics and statistics concepts. In particular linear, parabolic, and trigonometric functions, as well as the basic concepts of algebraic calculus.
Learning outcomes	This is an introductory physics course, with the main objective of presenting in a quantitative way all the primary laws of physics underlying other scientific disciplines. The course will focus on the conceptual understanding of everyday phenomena and recent technologies in terms of the underlying basic physical principles, with specific attention to the general mechanics of bodies and fluids, the thermology and thermodynamics concepts, and electromagnetism. The aim is to develop the mathematical models and discuss the criteria of the scientific method. The focus will be on the following targeted objectives: 1 - learning the definitions and meaning of the main physical quantities, and the laws that relate them; being able to express and physical

	quantity with the corresponding unit, and converting from one unit the the other; being able to perform a dimensional analysis of any physical law; understand the meaning of measuring a physical quantity, and attributing an error to the outcome; 2 - applying the concepts previously acquired, e.g. to the problem solving, getting used to scientific calculus and orders of magnitude estimates; 3 - being able to express a physical law in words, and viceversa translate a physical law into a mathematical relation between physical quantities.
Course contents	Introduction - Physical quantities and dimensions, metric units, scalar and vector quantities, trigonometry. Mechanics - Kinematics. Dynamics: Newton's law. Work and energy. Conservation of energy and momentum. Rotational dynamics. Circular and oscillating motion. Fluids – Fluid statics. Ideal fluid dynamics. Real fluid dynamics and applications. Thermology – Temperature and kinetic theory. Heat. Laws of thermodynamics. Electric and magnetic fields. Electrical charges, force, fields and energy. Electrical current and voltage. Electrical circuits. Magnetism and magnetic forces. Relationship between currents, time-varying electric and magnetic fields. Waves – General properties of waves. Electromagnetic waves. Optics: geometrical optics, lenses and mirrors, optical systems.
Teaching methods	Lectures will be given through PowerPoint presentations and blackboard explanations. The PowerPoint slides will facilitate the comprehension of the main concepts thanks to the projection of exemplifying pictures and images, while blackboard demonstrations and derivations will be needed to pause on topics that require more attention from the student. A few examples on how to deal with problems and exercises will be given during the lectures. A few simple experiments will also be presented to the class, to increase the visual impact of the main concepts to be conveyed. The course is integrated with a tutoring program to support the class through questions and problem solving assistance.
Reccomended or required readings	J. S. Walker, Fondamenti di Fisica, V edizione, Pearson Italia. J. Jewett e R. Serway, Principi di Fisica, IV edizione, Vol. I, EdiSES. A. Giambattista, B. McCarthy Richardson, R. C. Richardson, Fisica Generale, II edizione, McGraw-Hill. F. Borsa e A. Lascialfari, Principi di Fisica, EdiSES. Any other General Physics textbook that is suited for scientific degree courses can generally be recommended.
Assessment methods	There will be at least one practical class test (about one and half hours duration) during the course. A positive evaluation at this mid-term test might avoid the student to be finally evaluated, during the final exam, on the topics already probed during the test. How to pass the examination:

	There will be at least six final written examination dates all over the year. The written exams lasts about one and half hours, and it includes theory questions and problem solving exercises. The exam will be passed by obtaining a threshold mark at least sufficient (18/30) in the written part, and possibly include an oral examination, upon student request, to improve the final mark.
Further information	There will be at least one practical class test (about one and half hours duration) during the course. A positive evaluation at this mid-term test might avoid the student to be finally evaluated, during the final exam, on the topics already probed during the test. How to pass the examination: There will be at least six final written examination dates all over the year. The written exams lasts about one and half hours, and it includes theory questions and problem solving exercises. The exam will be passed by obtaining a threshold mark at least sufficient (18/30) in the written part, and possibly include an oral examination, upon student request, to improve the final mark.
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile