Course Title	**Physical Chemistry**				
Course Code	PHA201				
Course Type	Compulsory				
Level	BSc (Level 1)/ MPharm (Level 2)				
Year / Semester	2nd (3rd semester)				
Teacher's Name	Dr Maria Rikkou-Kalourkoti				
ECTS	6	Lectures / week	3	Laboratories/week	2
Course Purpose	This subject offers basic knowledge of Physical Chemistry to the students, so that they are better prepared to understand relative applications in areas of pharmacy, such as Physical Pharmacy, Pharmaceutical Technology and Pharmacochemistry. Topics such as physicochemistry of colloidal systems and potentiometric methods for pH and pKa determination are examples for demonstrating the principal aim of this course.				
Learning Outcomes	By the end of this course, the students should be able to: • Recognise thermodynamics and chemical kinetics; • State the methods for the determination of physicochemical parameters having an important role in drug action or medicinal preparations, like lipophilicity, polarity, molar refractivity, viscosity, diffusion and solubility; • State and analyse the interaction of molecules and light (electromagnetic rays), spectroscopy, polosimetry and polarography; • Distinguish interphase phenomena, e.g. adsorption • Explain gas behavior using the kinetic molecular model and different equations of state • Obtain relevant information from phase diagrams • Describe the properties of mixtures using thermodynamic properties • Demonstrate an understanding of the variables affecting the rates of chemical reactions.				
Prerequisites	PHA101 PHA102	Co-requisites	None		
Course Content	Thermodynamic properties of gases and state equation. Collision and kinetic theory of gases. Structure and thermodynamic properties of liquids. Thermodynamic laws. Internal energy, entropy, enthalpy, determination in chemical reactions. Thermochemistry, phase equilibrium. Properties of aqueous solutions, acids, bases and buffers. Ionisation, pH and pKa. Solutions of non electrolytic systems. Behaviour of interphases and colloidal systems. Electrolytic solutions and				

	equilibrium. Properties of solutions, osmosis, diffusion, solubility. Classical and quantum transition state theory. Oxidation and reduction. Kinetics of homogenous reactions. Crystal structure. Principles of photochemistry and spectroscopy. **Laboratory experiments/exercises:** As part of the course, laboratory exercises are carried out on the course material for a better deepening and consolidation of the theoretical part. Indicative exercises are: thermodynamics –Determination of entropy in chemical reaction, effect of temperature on the rate of a chemical reaction, determination of distribution coefficient, determination of pKa, spectroscopy (UV-vis) and determination of refractive index.
Teaching Methodology	Teaching methodology of the course includes lectures on the theoretical background and laboratory exercises / experiments to better understand the concepts of physical chemistry. PowerPoint presentations, picture-rich material, molecular models and short animations are used to help students better understand molecular geometry, stereochemistry and the effect on chemical and physical properties. Power point presentations are available to students through the e-learning platform. During lectures students are challenged through discussions, questions and answers and are guided to comprehend basic chemistry concepts/principles. Relevant problems are presented and solved in the class and also are given to students for further practice at home. As part of the development of students' skills, laboratory exercises are carried out by the students (collection and analysis of data, apply theory and draw conclusions, completion of laboratory reports). The evaluation of students is also based on written lab reports submitted for each laboratory exercise they perform.
Bibliography	(a) Textbooks: • Physical Chemistry, P. Atkins, J. de Paula, Greek translation Greek Publisher University of Crete, 2018. • Physical Chemistry, 11th Edition. P. Atkins, J. de Paula, J. Keeler, Oxford University press, 2017 (b) References: • "Physical Chemistry for the Chemical and Biological Sciences", R. Chang, University Science Books; 3rd edition 2000. • «Επίτομη Φυσικοχημεία», Δ.Α. Γιαννακουδάκης, Ζήτη, Θεσσαλονίκη, 1996. • «Φυσικοχημεία, Βασική Θεώρηση», Ν. Α. Κατσάνου, Εκδόσεις Παπαζήση ΑΕΒΕ, 1992
Assessment	Written Mid-Term Exam: 20% • Laboratory Reports: 20%

	• Written Final Exam: 60% The evaluation of the course is performed by (a) a written mid-term exam during the semester, which examines specific modules of the course and it accounts for 20% of the overall grade, (b) the laboratory grade and it accounts for 20% of the overall grade, and (c) a written final exam, which examines all modules of the course, and it accounts for 60% of the overall grade. Students are prepared for the above written exams by solving problems, related to the course content in the class, while additional problems are given to the students for further practice at their own time. Frequent revisions are also performed to help students comprehend various chemical concepts and principles of techniques used in the specific field of study. The Mid-term and final examination comprise of questions and numeric problems in order to evaluate the degree of understanding of the concepts and principles of chemistry and the ability to apply theory in solving problems, which require to use more than one concept or equation as well as investigation and/or quantification of equations. The laboratory grade is based on laboratory reports and one final written examination. In Laboratory reports student must describe their experimental work (20 %), analyse their results (30%) and answer some critical questions (50%), to examine the degree of understanding of the concept of the laboratory exercise. The laboratory final exam comprises of a test made of questions and numeric problems. The overall lab grade is calculated as shown in the equation: Lab grade = 0,60* (Average grade of laboratory reports) + 0,40* Lab final examination The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Language	Greek, English