Course Title	**General and Inorganic Chemistry**				
Course Code	**PHA101**				
Course Type	Compulsory				
Level	BSc (Level 1)/ MPharm (Level 2)				
Year / Semester	1st year/1st semester				
Teacher's Name	Dr Maria Rikkou-Kalourkoti				
ECTS	6	Lectures / week	3	Laboratories/ week	2
Course Purpose	Pharmacy, although based on Chemistry, Biology and Medicine, is considered a distinct science. However, it requires strong knowledge of specific branches of the above sciences. Thus, the aim of this course is to introduce the students to General and Inorganic Chemistry, e.g. construction of atoms, laws and rules of Chemistry, chemical behaviour of elements and their compounds, as well as their distribution, and, further, methods of their isolation and properties.				
Learning Outcomes	**By the end of this course, the students should be able to:** • Describe the basic principles and theories of general and inorganic chemistry • Apply basic principles and theories in order to solve quantitative and qualitative problems. • Employ the general ways of preparation for a number of elements and their compounds, which may be useful in Pharmaceutical Sciences mostly as starting materials, catalysts, other aids. • Draw conclusions from experimental observations and measurements, and link them to theory. • Apply the naming rules of inorganic compounds as a tool of understanding during the course of the subject • Manage the table of elements based on the concept of periodicity • Predict the chemical behavior of simple inorganic molecules in relation to their chemical bond and molecular geometry and correlate with pharmaceutical and life sciences applications. • Associate different types of intermolecular forces in the study of physical properties				
Prerequisites	None		Corequisites	None	

Course Content	Structure of atoms. The Schrödinger equation for the hydrogen atom. Atomic orbitals and electronic configuration of atoms. Atomic and molecular weights. Properties and Periodic Table of Elements. Quantum theory of atoms. Chemical bonds, molecular orbitals. Hybridization, ionic bond, dipole interactions, coordination and metal complexes. Elements of chemical thermodynamics and kinetics. Oxidations, reductions, electronegativity. Spectroscopy. Acids, bases, salts. Hydrogen, oxygen and their compounds. Study of the important elements of the periodic table and their main compounds (preparation, general characteristics and chemical behaviour). Allotropic state of elements. Boranes, silicones and fluorocarbons. **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: introduction to the General and Inorganic Laboratory, preparation of solutions of different concentrations, redox Titration, acid base Titration, volumetric determination of the acetic acid in vinegar, measurement of the pH value for different solutions and potentiometric determination of Ka of acids and determination of the Ksp of $Ca(OH)_2$
Teaching Methodology	Teaching methodology of the course includes lectures on the theoretical background and laboratory exercises / experiments to better understand concepts of chemistry. PowerPoint presentations are used, picture-rich material, molecular models and short animations to better understand molecular geometry, stereochemistry and the effect on chemical and physical properties. Power point presentations are available to students through e-learning platform. During lectures students are challenged for explanations (discussions, questions and answers) to guide them to chemistry concepts/principles. Related problems are presented and solved in the class and are also given to students for further practice. As part of the development of students' skills, laboratory exercises are carried out by students, who work in small groups or alone (collection and analysis of data, apply theory and draw conclusions, completion of laboratory reports). Written reports for each laboratory exercise are submitted and evaluated.
Bibliography	**(a) <u>Textbooks:</u>** • Shriver and Atkins' Inorganic Chemistry by Atkins, Peter; Overton,

	Tina; Rourke, Jonathan; Weller, Mark Published by: OUP Oxford, 7th edition New York, 2018 • "General and Inorganic Chemistry", G. Manousaki, 2016. (Publisher: Kyriakidi Despoina, Thessaloniki). • "Laboratory experiments in General and Inorganic Chemistry", M. Lalia-Kantouri, S. Papastefanou, L. Tzavellas, 2001. (Publisher: Ziti) **(b) <u>References:</u>** • "Practical Skills in Chemistry", J. Dean, D. Holmes, A. M. Jones, A. Jones, R. Reed and J. Weyers. 3rd ed. 2017. (Publisher: Pearson Education Limited) • "General and Inorganic Chemistry", M. Lalia-Kantouri, S. Papastefanou, 1995. (Publisher: Ziti)
Assessment	• Written Mid-Term Exam: 30% • Laboratory Reports: 20% • Written Final Exam: 50% 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 30% 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 50% of the overall grade. Students prepare for the above written exams by solving problems, related to the course content, in class, while additional problems are given to the students for further practice at home. Frequent revisions are also performed so to help students comprehend the various chemical concepts and principles of techniques used in the field of study. The Mid-term and final examination comprises of a written test made 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 extracted from laboratory reports, experimental work and one final examination. In Laboratory reports student must describe their experiment work (20 %), analyse their results (30%) and answer critical questions (50%), to examine the degree of understanding of the concept of the laboratory exercise. The laboratory final exam comprises a written 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 (written final exam) 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