UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Course Code	**Course Title**	**Credits (ECTS)**
PHAR-150	Γενική και Ανόργανη Χημεία/ General and Inorganic Chemistry	6
Department	**Semester**	**Prerequisites**
Life & Health Sciences	Fall	None
Type of Course	**Field**	**Language of Instruction**
Required	Pharmacy	Greek/English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	1st year	Photos Hajigeorgiou/Zoi Konsoula
Mode of Delivery	**Work Placement**	**Co-requisites**
face-to-face	N/A	None

Objectives of the Course:

The main objective of the General and Inorganic Chemistry Course is to introduce the basic principles and methodologies of Chemistry to create a sound starting point for the study and comprehension of the correlation between structure and the properties of materials which students will have to study in more detail in the following years. In particular, by means of simple teaching laboratory experiences carried out alongside the theoretical lessons, students should develop the ability to apply critical reasoning, in particular regarding the ability to apply the concepts of basic Chemistry to simple practical problems or simple phenomena.

Learning Outcomes:

After completion of the course students are expected to:

- Understand the current scientific conceptions of atomic structure and the effects of the formation of the chemical bond.
- Understand their knowledge on the quantum structure of the atomic structure principle small and then medium- sized molecules and their interactions with other molecules respectively .
- Explain the periodicity of the chemical properties of the data and the results of the chemical behavior of chemical compounds.

- Apply basic knowledge and principles governing the thermodynamics, kinetics , and chemical equilibrium.
- Understand the properties of the solutions, especially solutions of weak acids and bases as well as the behavior of the buffers .
- Perform measurements/mathematical calculations related to chemistry
- Understand chemical nomenclature and atomic symbols
- Describe the properties, types and states of matter
- Explain chemical structure and molecular orbitals
- Explain quantum theory and electronic structure
- Use the periodic table and chemical handbooks
- Define and use stoichiometry and the mole concept
- Explain the basics of thermochemistry
- Explain chemical bonding
- Explain gases and their properties
- Understand the bulk properties of liquids
- Understand solutions

Course Contents:

1. Structure of the atom : Electron atomic structure , electronic layers and sublayers , and orbital quantum numbers . Rules of Aufbau, Pauli and Hund. Individual and mass number , isotopes and atomic mass . Periodicity of the data.
2. Chemical compounds and chemical bonds : Elements, compounds and mixtures. Ionic and covalent bond. Polarity of compounds, electronegativity and dipole moment . Structure Lewis, coordination and typical load . VSEPR theory and shape of the molecules. Theory valence bond , p and p bond . Theory of molecular orbitals, bond and non-bonding orbitals and bond order . Hybridization .
3 . Chemical formulas and nomenclature of inorganic compounds.
4. Chemical equations and reaction stichiometry: Balancing chemical equations. Molecular mass, mole (mol), and Avogadro number molarity solutions. Stichiometric calculations limiting reactant and reaction yield .
5. Chemical Equilibrium: The constant of equilibrium (Kc, KP), calculation and interpretation of the numerical value. Heterogeneous equilibrium. Restore the chemical balance and rule of Le Châtelier.
6. Acids and bases: Definition Arrhenius, Brønsted-Lowry and Lewis. Chemical balance of water, scale of pH. Chemical equilibrium of weak acids and bases, pH determination of the solutions in constant Ka and Kb and application of equation Henderson-Hasselbach. Neutralization reactions, neutralization curve / titration and determination of solution concentration by titration .
7. Buffers: Function of buffers in general. Selection and preparation of the appropriate buffer. Buffers in medicine.
8. Intermolecular forces and properties of solutions: Forces ion - dipole , dipole- dipole , London dispersion and hydrogen bond . Effect of

intermolecular forces at the boiling point and solubility. Factors affecting solubility , saturated , unsaturated and supersaturated solutions . Units of measurement of the concentration of the solutions. Dilutions .
9. Chemical kinetics : speed and order of the reaction , factors that affect the speed , determination of the initial velocity and the law of speed of reaction. Reactions 1st and 2nd class. Effect of temperature .
10. Thermodynamics: Closed, open and insulated system , laws of thermodynamics, enthalpy and entropy changes in reactions and physical states , endothermic and exothermic reactions , spontaneous reactions.
Exercise 1: Construction of atoms and molecules;
Exercise 2: Thermodynamic Laws;
Exercise 3: Kinetics of chemical reactions;
Exercise 4: Precipitation and solubility product;
Exercise 5: Spectroscopy (UV-vis).
Exercise 6: Titrations

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, laboratory and laboratory reports

Assessment Methods:

Final Examination, course work

Required Textbooks/Reading:

Authors	**Title**	**Publisher**	**Year**	**ISBN**
Παπαστεφάνου Στέργιος	Γενική και ανόργανη χημεία	Ζήτη		
Darell Ebbing, Steven Gammon	Γενική Χημεία	ΤΡΑΥΛΟΣ & ΣΙΑ ΟΕ		

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
D.F. Shreiver, P.W. Askingo, C.H. Langford	Inorganic Chemistry	Oxford University Press		
I. Butler, J. Harrod, Μετάφραση Κουτσολέλος	Ανόργανη Χημεία	Travlos and Kostarakis		