UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-150	General and Inorganic Chemistry/ Γενική και Ανόργανη Χημεία	6
Prerequisites	**Department**	**Semester**
None	Health Sciences	Fall/Spring
Type of Course	**Field**	**Language of Instruction**
Compulsory	Pharmacy	English/Greek
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Psychoudaki Magda, Dr Christou Stavroula, Ms Loizou Maria, Ms Savva Maria	1st
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-Face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

- Introduce the basic principles of Chemistry and current scientific insights into the structure and its effect on chemical bonding
- Expand the knowledge on the quantum structure of the atom
- Understand the periodicity of the chemical properties of the elements and its effect on the chemical behavior of the compounds
- Apply basic knowledge and principles of kinetics, and chemical equilibrium
- Understand the properties of solutions and particularly those of weak acids and bases solutions as well as the behavior of buffers
- Develop the ability to predict the activity of the molecules taking into account their structure
- Apply principles governing chemical equilibrium and chemistry of redox reactions

Learning Outcomes:

After completion of the course students are expected to be able to:

- Know the theories of the bond formation

- Describe the structure of the atom, the influence of the structure of the atom of the elements on its periodic properties
- Explain the structures (hybridization, geometry, and polarity) and compare physical properties (boiling point, melting point, solubility, conformations, and stability) of inorganic compounds
- Apply the IUPAC Inorganic Compound Nomenclature rules
- Demonstrate knowledge of chemical equations and the stoichiometry of reactions
- Know the properties of the solutions and the factors that affect them
- Determine the concentration of the solute using different units of measurement

Perform simple experimental procedures and experiments and evaluate the results of experimental measurements

Course Content:

- Chemical formulas and nomenclature of inorganic compounds
- Structure of the atom: Electronic structure, orbitals and quantum numbers. Principles of Aufbau, Pauli's and Hund's rule. Atom and Mass numbers, isotopes and atomic mass. Periodicity of data.
- Chemical compounds and chemical bonds: elements, compounds and mixtures. Ionic and covalent bond. Polarity of chemical compounds, electronegativity and bipolar torque. Lewis structure. VSEPR theory. Valence-bond theory, σ and π bond. Molecular orbitals. Hybridization.
- Chemical equations, reaction stoichiometry and solution chemistry. Molar mass, mole (mol), Avogadro number. Stoichiometric calculations, reaction yield. Saturated, unsaturated and supersaturated solutions. Units for measuring the concentration of solutions. Dilution of the solutions.
- Chemical equilibrium: Constant chemical equilibrium (K_c, K_P), calculating and interpreting the arithmetic value. Le Châtelier's principle.
- Acids and bases: Arrhenius, Bronsted-Lowry and Lewis definitions. Chemical equilibrium of water, pH range. Chemical equilibrium of weak acids and bases, determination of pH of solutions, K_a and K_b constants and application of the Henderson-Hasselbach equation.
- Buffers: Selection and preparation of the appropriate buffer solution. Buffer capacity. pH range
- Intermolecular forces: Ion-dipole, dipole-dipole, London dispersion and Hydrogen Bonding.
- Redox: oxidation, reduction, redox correlation galvanic elements, standard redox potential, Nernst equation.

Laboratory experiments

1. Safety rules - Laboratory behaviour - Reagent risk - Guidance on writing a laboratory report

2. Mass and Volume Measurements in Chemical Laboratory

3. Find Empirical Formula

4. Preparation of solutions - Expression of the concentration of solutions

5. Double Replacement Reactions and Precipitations

6. Factors affecting the position of chemical equilibrium: Le Châtelier principle.

7. Determination of the acidity of vinegar (concentration of acetic acid)

8. Preparation and measurement of pH buffers

9. Determination of molecular mass and ionization constant of unknown weak acid

10. Redox titration – Silver mirror experiment

Learning Activities and Teaching Methods:

Lectures, class discussion, assignments, laboratory and laboratory reports

Assessment Methods:

Final exam, Midterm exam, Lab reports and exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
General Chemistry	Darell Ebbing – Steven Gammon	Edition 11th Cengage Learning	2016	9781305580343
Chemistry the Central Science	T.L. Brown, H.E. Le May, B.E. Bursten	Prentice Hall	2012	0321696727
Chemistry for Pharmacy Students: General, Organic and Natural Product Chemistry	Satyajit D. Sarker Lutfun Nahar	John Wiley & Sons Ltd	2007	9780470017807 (HB)