**UNIVERSITY OF PATRAS**
**SCHOOL OF HEALTH SCIENCES**
**DEPARTMENT OF PHARMACY**
**UNDERGRADUATE STUDIES' COURSES**

COURSE DESCRIPTION: **GENERAL AND INORGANIC CHEMISTRY**
COURSE CODE: **PHA-A11-NEW**

**GENERAL AND INORGANIC CHEMISTRY**
**COURSE DESCRIPTION**

## 1. GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | HEALTH SCIENCES | | |
| **DEPARTMENT** | PHARMACY | | |
| **LEVEL OF COURSE** | UNDERGRADUATE | | |
| **COURSE CODE** | **PHA-A11-NEW** | **SEMESTER OF STUDIES** | **1st** |
| **COURSE TITLE** | GENERAL AND INORGANIC CHEMISTRY | | |

| **INDEPENDENT TEACHING ACTIVITIES** | **TEACHING HOURS PER WEEK** | **ECTS CREDITS** |
|---|---|---|
| Lectures | 4 | 6 |
| Tutorial classes | 2 | |

| | |
|---|---|
| **COURSE TYPE** | General Background Course |
| **PREREQUISITE COURSES:** | - |
| **TEACHING AND ASSESSMENT LANGUAGE:** | Greek |
| **THE COURSE IS OFFERED TO ERASMUS STUDENTS** | Yes [Instructed/Guided self study in english for Erasmus+ Students] |
| **COURSE WEBPAGE (URL)** | http://www.pharmacy.upatras.gr/images/DS/PHA-A11-EN.pdf |

## 2. LEARNING OUTCOMES

| **Learning Outcomes** |
|---|
| This course aims at acquiring knowledge, skills and competences related to Level 6 of the European Qualifications Framework for Lifelong Learning.<br>Specifically, upon successful completion of the course, the students are expected to:<br>1. have obtained valid knowledge and comprehension of the fundamental principles of General and Inorganic Chemistry, supported by scientific textbooks and recent data acquired from research in this scientific field.<br>2. have acquired the ability to combine theory and calculations in the field of General and Inorganic Chemistry to solve problems appearing during their studies and afterwards, while working as Pharmacists.<br>3. be capable to use the acquired knowledge in the field in a professional way. |
| **GENERAL ABILITIES** |
| Retrieve, analyse and synthesise data and information, with the use of necessary technologies<br>Work autonomously<br>Work in an interdisciplinary environment<br>Work in an international context<br>Be critical and self-critical<br>Advance free, creative and causative thinking |

## 3. COURSE CONTENT

- The structure of atom. Electromagnetic radiation- Atomic spectra. The dual nature of the electron.
- The uncertainty principle. The Schrodinger Equation- Quantum numbers, Atomic Orbitals. The Pauli exclusion principle.
- Periodic Table of the Elements. Atomic numbers and the periodic law. General Features of the Periodic Table, Electron configurations and Periodic properties of the elements. Magnetic properties.
- Chemical bonding. Ionic bonds, Covalent bonds, Coordinate covalent bonds, Dipole moment, Resonance, Valence bond theory – Hybridization. Valence Shell Electron Pair Repulsion (VSEPR) theory and molecular structure. Theory of Molecular Orbitals. Orbital overlap and bond strength.
- Gases. The ideal gas law, Kinetic theory of gases, Distribution of molecular speeds, Dalton's Law of partial pressures, Graham's law of diffusion.
- Liquids and Solids. Surface tension of liquids, vaporization - vapor pressure, boiling and boiling point, melting and melting point, vapor pressure of solid compounds, sublimation, phase diagrams, thermodynamic properties associated with phase transitions. Types of solids. Intermolecular forces.
- Solutions. Ways of expressing concentration, Dissolution – Enthalpy of Solution, Vapor pressure of a solution, Osmotic pressure
- Rates of reaction. Half-life of a reaction. Reaction rates and equilibrium.
- Chemical Equilibrium. Reversible reactions and equilibrium constants, Equilibrium constants in heterogeneous equilibria. Changing the reaction conditions – Le Chatelier Principle. Acid base equilibria in aqueous solutions, weak electrolytes, Ostwald's dilution law, Self-Ionization of water – pH, acid-base indicators, buffers, hydrolysis, the solubility product constant – precipitation, Common-Ion effect, neutralization reactions –titration curves.
- Acids and Bases. Bronsted-Lowry concept of acids and bases. Strong and weak acids and bases, Acid strength and molecural structure. Lewis theory.
- Chemical Thermodynamics. First Law of Thermodynamics. Enthalpy. Thermochemistry. Heat capacity. Temperature dependence of enthalpy change, ΔH. Entropy and the second Law of Thermodynamics. Temperature dependence of Entropy. Absolute entropies and the third Law of Thermodynamics. Free Energy and equilibrium constant. Temperature dependence of chemical equilibrium.
- Oxidation-Reduction reactions. Oxidation states. Balancing Oxidation-Reduction reactions in acidic and basic solutions.

## 4. TEACHING AND LEARNING METHODS - ASSESSMENT

| | |
|---|---|
| **Teaching method** | Face to Face |

| | |
|---|---|
| **Use of information and communication technologies** | • The teaching and learning process is supported by the University of Patras e-class platform. The teaching material for each chapter is uploaded and stored on the e-class and it is freely accessible to all students.<br>• Teaching process is supported by Information and Communication |
| **TEACHING ORGANIZATION** | ***Teaching Method*** — ***Semester Workload***<br>Lectures — 52<br>Tutorial classes — 26<br>Study and analysis of scientific papers and book chapters — 12<br>Private un-supervised study — 60<br>***Total number of hours for the Course***<br>**(25 hours of work-load per ECTS credit) — 150** |
| **STUDENT ASSESSMENT** | Assessment language: Greek<br>Final Written Exams: Multiple choice questions, short answer and matching questions, questions of judgement and solving of problems.<br>The assessment criteria are presented to the students during the lectures and the tutorial classes. |

## 5. RECOMMENDED LITERATURE

***Suggested Books***

1. General Chemistry, Principles and Applications, Darrell Ebbing & Steven Gammon
Translated by: Nikolaos Klouras
10th International Edition/2014, Travlos Publications
ISBN: 978-618-5061-02-9

2. Basic Inorganic Chemistry, A. Cotton, G. Wilkinson, P. Gaus
3rd Edition/2015, Parissianos Publications
ISBN: 9789605830663

***Relevant Scientific Journals***

Inorganic Chemistry (ACS Publications)