

SCHOOL OF HEALTH SCIENCES

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



COURSE DESCRIPTION: PHYSICAL CHEMISTRY COURSE CODE: PHA-B13-NEW GENERAL

# PHYSICAL CHEMISTRY COURSE DESCRIPTION

|                     | GENERAE                                      |   |   |                         |     |              |  |
|---------------------|--|---|---|-------------------------|-----|--------------|--|
|                     | SCHOOL                                       | HEALTH SCIENCES   |   |                         |     |              |  |
|                     | DEPARTMENT                                   | PHARMACY  |   |                         |     |              |  |
|                     | LEVEL OF COURSE                              | UNDERGRADUATE   |   |                         |     |              |  |
|                     | COURSE CODE                                  | PHA-B13-NEW   |   | SEMESTER                | 3rd |              |  |
|                     | COURSE TITLE                                 | PHYSICAL CHEMISTRY                                      |   |                         |     |              |  |
|                     | INDEPENDENT                                  | TEACHING ACTIVITIES                                     |   | CHING HOURS<br>PER WEEK |     | ECTS CREDITS |  |
| Lectures            |  |   | 5 | 4                       |     | 7            |  |
| Laboratory practice |  |   | 5 | 3                       |     |              |  |
|                     | COURSE TYPE                                  | General Background course                               |   |                         |     |              |  |
|                     | PREREQUISITE COURSES:                        | -   |   |                         |     |              |  |
|                     | TEACHING AND ASSESSMENT<br>LANGUAGE:         | Greek   |   |                         |     |              |  |
|                     | THE COURSE IS OFFERED TO<br>ERASMUS STUDENTS | Not offered   |   |                         |     |              |  |
|                     | COURSE WEBPAGE (URL)                         | http://www.pharmacy.upatras.gr/images/DS/PHA-B13-EN.pdf |   |                         |     |              |  |

## 2. LEARNING OUTCOMES

#### Learning outcomes

The course is the basic introduction to the concepts of Physical Chemistry and their application to physical and chemical processes. It also applies to some simple pharmaceutical and biological systems.

Specifically, it develops a) the methodology of extracting mathematical relationships from a series of experimental data for ideal and real gases, b) the methodology of extracting mathematical relationships from a simple theoretical systems setting some basic principles and assumptions and the confirmation or rejection of mathematical relationships through experimental design.

Understanding

- a) the basic principles of Thermodynamics in simple systems, the changes of thermodynamic parameters during the interactions of simple systems and the conditions that lead to spontaneous changes and in a state of equilibrium
- b) the basic principles of phases equilibrium, the phase change conditions of matter in simple and binary systems and their application to physical processes (distillation, sublimation, crystallization, lyophilization)
- c) the basic principles of chemical thermodynamics and thermochemistry and their application in aqueous chemical systems (pH, buffer solutions, dissociation of strong and weak electrolytes)
- d) the basic principles of chemical kinetics and their application in stability and degradation of active pharmaceutical ingredients in pharmaceutical formulations and
- e) the basic principles of electrochemistry (conductivity of solutions, activities in electrolyte solutions, electrical double-layer, electrode potentials, electrochemical equilibrium, Nernst equation, reference electrodes, membrane potentials, glass electrode).

## **General Abilities**

- 1. Analyze and synthesize data and information, using the necessary technologies
- 2. Independent work
- 3. Group work

## 3. COURSE CONTENT

- i. Empirical properties of gases
- ii. Kinetic theory of gases
- iii. Basic concepts and laws of Thermodynamics
- iv. Equilibrium of Phases
- v. Chemical equilibrium and Thermochemistry
- vi. Chemical Kinetics
- vii. Electrochemistry

#### 4. TEACHING AND LEARNING METHODS - ASSESSMENT

| TEACHING METHOD   | In class and laboratory on hands training  |   |  |  |  |
|---|--|---|--|--|--|
| USE OF INFORMATION AND<br>COMMUNICATION<br>TECHNOLOGIES | Support of learning process through the online platform e-class,<br>Software for data acquisition during laboratory experiments and<br>software for processing of experimental data.   |   |  |  |  |
| TEACHING ORGANIZATION                                   | Teaching MethodSerLecturesPractical Lab ExercisesGroup lab reports and presentationsAutonomous studyTotal Courses load(25 ώρες φόρτου εργασίας ανά πιστωτική μονάδα)   | nester Workload<br>52<br>18<br>40<br>65<br><b>175</b> |  |  |  |
| STUDENT ASSESSMENT                                      | <ol> <li>Written final examination (70%) including         <ul> <li>Questions of brief development</li> <li>Judgment questions</li> <li>Problems solving</li> </ul> </li> <li>Laboratory exercises (30%) including         <ul> <li>Examination on laboratory practices</li> <li>Presentation of group work for each laboratory (processing of experimental data – developme)</li> <li>Written exam</li> </ul> </li> </ol> | ry exercise<br>ent of final results)                  |  |  |  |

#### 5. RECOMMENDED LITERATURE

- 1) N. A. Katsanos, Physical Chemistry Basic Principles, Publisher PAPAZISIS, 3rd edition completed, 1993 (in Greek)
- 2) Atkins Peter & De Paula Julio, Physical Chemistry (translation of 9th English edition), Crete University Press, 2014 (in Greek)