

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Science		
<b>ACADEMIC UNIT</b>	Physics		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>10E/AE41</b>	<b>SEMESTER</b>	<b>8</b>
<b>COURSE TITLE</b>	<b>CHEMISTRY</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures (theory and exercises)		4	6
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	General Knowledge		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes, in the English language for Erasmus students		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uoa.gr/courses/PHYS267/">https://eclass.uoa.gr/courses/PHYS267/</a>		

## (2) LEARNING OUTCOMES

### Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

With the completion of the course the student is able to:

Describe the atomic structure and the periodicity of the atomic properties.

Define the type and the strength of the bonds between the atoms of a specific molecule as well as the intermolecular interactions.

Determine the physical properties of chemical systems.

Classify the chemical reactions in spontaneous or not spontaneous using thermodynamic criteria.

Express the concentration of a solution in different ways.

Describe the acidic or basic behavior of chemical substances as well as buffer solutions.

Explain the atomic structure.

Distinguish between acidic, basic and neutral solutions.

Calculate the concentration of a solution.

Estimate the strength of a chemical bond.

Combine meanings such as the structure of the atoms which compose the materials and conclude their state and physical properties.

Explain the spectral characteristics of the chemical molecules and propose their possible structure.

Design a buffer solution with buffering capacity of specific range.

### General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and

sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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The course aims at the following general competences

Adapting to new situations

Decision-making /Working independently

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for the natural environment

Criticism and self-criticism

Production of free, creative and inductive thinking

Analytical and synthetic thinking

Critical thinking /Time management /Planning

New Technology skills

Creativity / Determination / Communication skills

Information management / Self control skills

Meeting Deadlines and Keeping Schedules

Flexibility / Adaptability

Problem solving

### **(3) SYLLABUS**

- Atoms and Periodic System.
- Chemical Bond.
- States of Matter.
- Chemical Thermodynamics.
- Chemical Equilibrium and Chemical Kinetics.
- Solutions in Chemistry. Acids and Bases.
- Redox reactions.
- Topics in Spectroscopy.

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p><b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i></p>	Face-to-face													
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Yes</p> <p>Electronic communication with the students using ICT (Information and Communications Technology) Computer-aided lectures, use of Overhead Projectors, eclass platform.</p>													
<p><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"><b>Activity</b></th> <th><b>Semester workload</b></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">39</td> </tr> <tr> <td>Exercises</td> <td style="text-align: center;">13</td> </tr> <tr> <td>Individual Study/ Study and Analysis of bibliography / Preparation</td> <td style="text-align: center;">85</td> </tr> <tr> <td>Interactive Teaching</td> <td style="text-align: center;">13</td> </tr> <tr> <td><b>Course Total</b></td> <td style="text-align: center;"><b>150</b></td> </tr> </tbody> </table>		<b>Activity</b>	<b>Semester workload</b>	Lectures	39	Exercises	13	Individual Study/ Study and Analysis of bibliography / Preparation	85	Interactive Teaching	13	<b>Course Total</b>	<b>150</b>
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<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Final written exams in Greek Open-ended questions, Problem solving Mid-term written examination Writing essays</p>													

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography*

- 1 Βασικές Αρχές Ανόργανης Χημείας, Πνευματικάκης Μητσοπούλου, Κ. Μεθενίτης, ΕΚΔΟΣΕΙΣ UNIBOOKS, 2006, ΑΘΗΝΑ.
- R. Chang, J. Overby, Γενική Χημεία, Εκδόσεις Παπαζήση, 2021.

*- Related academic journals:*

- Journal of Chemical Education, American Chemical Society (ACS) Publications