

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	Natural Sciences		
<b>ACADEMIC UNIT</b>	Department of Chemistry		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	<b>XHY101 (1.1)</b>	<b>SEMESTER</b>	1 <sup>st</sup>
<b>COURSE TITLE</b>	<b>Analytical Chemistry I</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>	
	4	5	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	General background		
<b>PREREQUISITE COURSES:</b>	No		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes		
<b>COURSE WEBSITE (URL)</b>	No		

### (2) LEARNING OUTCOMES

<p><b>Learning outcomes</b> <i>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.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li><i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i></li> <li><i>Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i></li> <li><i>Guidelines for writing Learning Outcomes</i></li> </ul>																			
<p>Students will gain basic knowledge on analytical chemistry (Methods of Chemical Analysis. Chemical Reactions (writing and completing). Solutions and concentrations. Stoichiometric computations. Chemical equilibrium and rate of a chemical reaction. Equilibria of weak acids and bases. Water ionisation-hydrolysis-pH. Heterogeneous equilibria. Precipitation-Equilibria involving complex ions. Zwitterionic compounds and redox systems. Applications in Analytical Chemistry). They will learn how to search in literature and analyze data using new technologies. Their survey and bibliographic work will promote free, creative and inductive thinking.</p>																			
<p><b>General Competences</b> <i>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?</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i></td> <td style="width: 50%; border: none;"><i>Project planning and management</i></td> </tr> <tr> <td style="border: none;"><i>Adapting to new situations</i></td> <td style="border: none;"><i>Respect for difference and multiculturalism</i></td> </tr> <tr> <td style="border: none;"><i>Decision-making</i></td> <td style="border: none;"><i>Respect for the natural environment</i></td> </tr> <tr> <td style="border: none;"><i>Working independently</i></td> <td style="border: none;"><i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i></td> </tr> <tr> <td style="border: none;"><i>Team work</i></td> <td style="border: none;"><i>Criticism and self-criticism</i></td> </tr> <tr> <td style="border: none;"><i>Working in an international environment</i></td> <td style="border: none;"><i>Production of free, creative and inductive thinking</i></td> </tr> <tr> <td style="border: none;"><i>Working in an interdisciplinary environment</i></td> <td style="border: none;">.....</td> </tr> <tr> <td style="border: none;"><i>Production of new research ideas</i></td> <td style="border: none;"><i>Others...</i></td> </tr> <tr> <td style="border: none;"></td> <td style="border: none;">.....</td> </tr> </table>		<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>	<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>	<i>Decision-making</i>	<i>Respect for the natural environment</i>	<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>	<i>Team work</i>	<i>Criticism and self-criticism</i>	<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>	<i>Working in an interdisciplinary environment</i>	.....	<i>Production of new research ideas</i>	<i>Others...</i>		.....
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	.....																		

Search, analysis and synthesis of data and information, by using the proper technologies.  
 Working independently  
 Team work  
 Respect of natural environment  
 Promoting free, creative and inductive thinking  
 Understanding analytical science, demonstrate a coherent understanding of analytical chemistry  
 Depth and breadth of analytical chemistry knowledge  
 Inquiry and problem solving, critically analyse and solve problems in analytical chemistry  
 Personal and professional responsibility, be accountable for individual learning and scientific work in analytical chemistry

### (3) SYLLABUS

Methods of Chemical Analysis. Chemical Reactions (writing and completing). Solutions and concentrations. Stoichiometric computations. Chemical equilibrium and rate of a chemical reaction. Equilibria of weak acids and bases. Water ionisation-hydrolysis-pH. Heterogeneous equilibria. Precipitation-Equilibria involving complex ions. Zwitterionic compounds and redox systems. Applications in Analytical Chemistry

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

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Face to face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of PowerPoint in lectures. Communication via email.	
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail. 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.  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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures	75
	Not guided study	50
	Course total	125
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure  Language 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  Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Written examination in Greek, with multiple choice questionnaires and short-answer questions.	

### (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- ΒΑΣΙΚΕΣ ΑΡΧΕΣ ΑΝΑΛΥΤΙΚΗΣ ΧΗΜΕΙΑΣ    ΘΕΜΕΛΗΣ ΔΗΜΗΤΡΙΟΣ    ΖΗΤΗ ΠΕΛΑΓΙΑ ΚΑΙ ΣΙΑ Ο.Ε.

ΣΗΜΕΙΩΣΕΙΣ ΜΑΘ. ΑΝΑΛΥΤΙΚΗΣ ΧΗΜΕΙΑΣ Ι	Α. ΒΛΕΣΣΙΔΗΣ Δ. ΓΚΙΩΚΑΣ	ΠΑΝΕΠΙΣΤΗΜΙΟ (ΣΗΜΕΙΩΣΕΙΣ) ΙΩΑΝΝΙΝΩΝ
<ul style="list-style-type: none"> <li>ΧΗΜΙΚΗ ΙΣΟΡΡΟΠΙΑ ΚΑΙ ΑΝΟΡΓΑΝΗ ΠΟΙΟΤΙΚΗ ΗΜΙΜΙΚΡΟΑΝΑΛΥΣΗ</li> </ul>	ΘΕΜΙΣΤΟΚΛΗΣ ΧΑΤΖΗΪΩΑΝΝΟΥ	ΕΛΕΝΗ ΧΑΤΖΗΪΩΑΝΝΟΥ
<ul style="list-style-type: none"> <li>ΣΗΜΕΙΩΣΕΙΣ ΜΑΘ. ΑΝΑΛΥΤΙΚΗΣ ΧΗΜΕΙΑΣ Ι</li> </ul>	Α. ΒΛΕΣΣΙΔΗΣ Δ. ΓΚΙΩΚΑΣ	ΠΑΝΕΠΙΣΤΗΜΙΟ (ΣΗΜΕΙΩΣΕΙΣ) ΙΩΑΝΝΙΝΩΝ
<ul style="list-style-type: none"> <li>D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, <i>Fundamentals of Analytical Chemistry</i>, 9th ed, Brooks/Cole Publ., Belmont (CA), 2014, pp. 2-437.</li> <li>Αναλυτική Χημεία e-book, Σ. Λιοδάκης (<a href="http://www.lib.ntua.gr/gr/el_sources/ebooks/liodakis/index.htm">http://www.lib.ntua.gr/gr/el_sources/ebooks/liodakis/index.htm</a>)</li> <li>ΠΟΣΟΤΙΚΗ ΧΗΜΙΚΗ ΑΝΑΛΥΣΗ, Τόμος Α, Χανιωτάκης Νίκος, Φουσκάκη Μαρία, Πανεπιστημιακές Εκδόσεις Κρήτης, 2009</li> </ul>		
<p><b>- Related academic journals:</b>  <i>Journal of Chemical Education</i>  <i>Analytical Chemistry</i>  <i>Analytica Chimica Acta</i>  <i>Talanta</i></p>		