

## 2<sup>nd</sup> Semester (II) (applied since 2016-17)

### Inorganic Chemistry-1 (Chemistry of the Representative Elements)

#### 1. GENERAL

<b>SCHOOL</b>	NATURAL SCIENCES		
<b>ACADEMIC UNIT</b>	CHEMISTRY		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	XA222	<b>SEMESTER</b>	2 <sup>nd</sup>
<b>COURSE TITLE</b>	INORGANIC CHEMISTRY 1 (CHEMISTRY OF REPRESENTATIVE ELEMENTS)		
<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		3	10
Seminars		1	
Laboratory work		3	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
<b>COURSE TYPE</b> <i>general background, special background, specialised general knowledge, skills development</i>	Field of Science (Inorganic Chemistry) and Skills Development (Experimental Inorganic Chemistry)		
<b>PREREQUISITE COURSES:</b>	Typically, there are not prerequisite course. Essentially, the students should possess: (a) knowledge provided through the previously taught theoretical courses "Introduction to Inorganic Chemistry", and (b) laboratory skills obtained through the previously attended laboratory-related course "Introduction to Inorganic Chemistry".		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek. Teaching may be however performed in English in case foreign students attend the course.		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	YES		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.upatras.gr/courses/CHEM2073/">https://eclass.upatras.gr/courses/CHEM2073/</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

By the end of this course the student will be able to appreciate the fact that:

There are some ninety-two naturally occurring elements as well as a handful of man-made radioactive elements. When in combination, these elements constitute all of our food, shelter, energy sources and everything we manufacture and use in our lives. This course provides a foundation for the understanding of the varying chemistries of the elements of the Periodic Table, with emphasis on inorganic materials. The course includes the descriptive chemistry of many of the most common elements and their compounds, integrating such topics as symmetry and structure, bonding models, reactions and the synthesis and characterization of inorganic compounds. An understanding of the behaviour of elements and their compounds is central to chemistry and borders the Earth and Life Sciences, as well as Engineering.

### 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?*

<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>Others</i>
<i>Production of new research ideas</i>	

By the end of this course the student will, furthermore, have developed the following skills (general abilities):

1. To develop expertise relevant to the professional practice of chemistry.
2. To develop an understanding of the range and chemistry of elements in the periodic table and their compounds.
3. To establish an appreciation of the role of inorganic chemistry in the chemical sciences.
4. To develop an understanding of the role of the chemist in measurement and problem solving in inorganic chemistry.
5. To provide an understanding of chemical methods employed for problem solving involving inorganic systems.
6. To provide experience in some scientific methods employed in inorganic chemistry.
7. To develop skills in procedures and instrumental methods applied in analytical and synthetic tasks of inorganic chemistry.
8. To develop skills in the scientific method of planning, developing, conducting, reviewing and reporting experiments.
9. To develop some understanding of the professional and safety responsibilities residing in working with inorganic systems.

Generally, by the end of this course the student will, furthermore, have develop the following general abilities (from the list above):

*Searching, analysis and synthesis of facts and information, as well as using the necessary technologies*

*Adaptation to new situations*

*Decision making*

*Autonomous (Independent) work*

*Group work*

*Exercise of criticism and self-criticism*

*Promotion of free, creative and inductive thinking*

*Respect to natural environment*

*Work design and management*

## 3. SYLLABUS

1. The elements.

2. The chemical compounds.
3. The isolation of elements.
4. The life cycle of compounds.
5. How we can systematically study the elements and their compounds.
6. Introduction to the chemical, biochemical and biological properties of metals, non-metals and semi-metals.
7. Chemistry of hydrogen and its compounds.
8. Chemistry of oxygen and its compounds.
9. On water.
10. The atmosphere.
11. General aspects of the chemistry of the 1<sup>st</sup> group elements.
12. General aspects of the chemistry of the 2<sup>nd</sup> group elements.
13. General aspects of the chemistry of the 13<sup>th</sup> group elements.
14. General aspects of the chemistry of the 14<sup>th</sup> group elements.
15. General aspects of the chemistry of the 15<sup>th</sup> group elements.
16. General aspects of the chemistry of the 16<sup>th</sup> group elements.
17. General aspects of the chemistry of the 17<sup>th</sup> group elements.
18. General aspects of the chemistry of the 18<sup>th</sup> group elements.

#### 4. TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> <i>Face-to-face, Distance learning, etc.</i>	Lectures, seminars and laboratory work 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 Information and Communication Technologies (ICTs) (e.g. PowerPoint) in teaching. The lectures content of the course for each chapter are uploaded on the internet, in the form of a series of ppt files, where from the students can freely download them using a password which is provided to them at the beginning of the course.	
<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> <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>	<b>Activity</b>	<b>Semester workload</b>
	Lectures (3 contact hours per week x 13 weeks)	39
	Seminars (1 contact hour per week x 13 weeks) - solving of representative problems	13
	Laboratory experiments (3 contact hours per week x 13 weeks)	39
	Final examination (3 contact hours)	3
	Hours for private study of the student and preparation of home-works (5 per semester), for Inorganic Chemistry-1, and reports, for the Laboratory, and preparation for the Laboratory (study of techniques and theory)	39
	Hours of Private Study of the Student for the preparation of the Final Examination	117
	Course total	<b>250</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i> <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,</i>	1. Oral examination during the seminars on problems given as homework in the lectures. The mark of the seminars is added to the final mark only when the student secures the minimum mark of 5 in the final written examination. 2. Final written examination. Greek grading scale: 1 to 10. Minimum passing grade: 5.	

<p><i>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><u>EXPERIMENTAL INORGANIC CHEMISTRY-1 (EOC-2)</u></p> <ol style="list-style-type: none"> <li>1. Written tests of 15 minutes duration at the beginning of each new laboratory period (experiment). The mean mark from these tests consists the 50% of the final grade (<math>G_{EOC-2}</math>).</li> <li>2. Reports following completion of each laboratory experiment. The mean mark of the consists the other 50% of the final grade (<math>G_{EOC-2}</math>).</li> </ol> <p>Minimum passing grade: 5.</p> <p><u>Final Course Grade (FCG)</u></p> <p><math>FCG = (G_{SOC} + G_{EOC-2}) / 2</math></p>
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## 5. ATTACHED BIBLIOGRAPHY

<ol style="list-style-type: none"> <li>1. P. Ioannou, "Chemistry of the Elements of the s and p groups", Volume I, Filomatheia Editions, 2006.</li> <li>2. P. Karagiannidis, "Topics in Inorganic Chemistry: The chemical elements and their compounds", 4th Edition, Ziti Editions, 2009.</li> </ol>
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