

COURSE OUTLINE

(1) GENERAL

SCHOOL	Environment & Agricultural Engineering		
ACADEMIC UNIT	Natural Resources Management & Agricultural Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	160	SEMESTER	1st
COURSE TITLE	GENERAL AND INORGANIC CHEMISTRY		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
<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>			
Lectures and Practice Exercises		5	5
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	general background		
PREREQUISITE COURSES:			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

(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*

GENERAL AND INORGANIC CHEMISTRY is the basic infrastructure course for understanding the principles of structure as well as the reactions of ions and chemical molecules.

The course aims to introduce students to basic concepts of the structure of individuals and the periodicity of their physical and chemical properties. The types of chemical bonds and the shape of the molecules, the speed of the chemical reactions and the factors on which it depends. In the physical state of materials and its relation to intramolecular and intermolecular forces. In the basic thermodynamic concepts and the study of complex compounds. The chemistry of the solutions, the redox reactions and the electrochemical behavior of the solutions.

The aim of the course is for students to understand the structure of the atoms and materials around us, the types of chemical bonds, the properties of solid, liquid and gaseous states of materials.

Upon successful completion of the course students will be able to:

- Describe the structure of atoms and how molecules and ions are formed
- Predict the stereochemical type of chemical molecules and ions.
- Know the structure and importance of complex compounds.
- Indicate the types of intermolecular forces and how this affects the physical state of materials and their dissolution in various solvents.
- Identify the factors that affect the speed of reactions.
- Know basic thermodynamic concepts and how they are applied to chemical systems.
- Know the chemistry of solutions.
- Know basic oxidation reactions and electrochemical behavior of solutions.

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

Search, analyze and synthesize data

- Decision making
- Autonomous Work
- Respect for the natural environment
- Exercise criticism and self-criticism
- Promoting free, creative and inductive thinking

(3) SYLLABUS

1. The atomic orbital.
2. Periodic Table (atom ion size, ionization energy, electronic affinity, electronegativity, electropositivity, metals, non-metals, semi-metals).
4. Ionic bond.
5. Quantum mechanical view of the covalent bond.
6. Molecular geometry (VSEPR theory, Prediction of molecular geometry based on valence bond theory).
7. Complexes.
8. Intermolecular forces.
9. States of matter.
10. Chemical Thermodynamics.
11. Solutions (solution characteristics, solubility, cumulative properties of solutions, colloids).
12. Chemical kinetics.
13. Ionic balances (acids - bases, pH, indicators, acid-base titrations).
14. Redox - Electrochemical applications.

(4) TEACHING and LEARNING METHODS - EVALUATION

<p>DELIVERY <i>Face-to-face, Distance learning, etc.</i></p>	<p>Lectures in the amphitheater and laboratory exercises in the laboratory.</p>	
<p>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use Powerpoint slides and selected videos. Communication with students via e-mail, e-class, e-student.</p>	
<p>TEACHING METHODS <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>	<p>Activity</p>	<p>Semester workload</p>
	<p>Lectures</p>	<p>50</p>
	<p>Laboratory Excercises</p>	<p>75</p>
	<p></p>	<p></p>
	<p></p>	<p></p>
	<p></p>	<p></p>
	<p>Course total</p>	<p>125</p>
<p>STUDENT PERFORMANCE EVALUATION <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>I. Written final exam in the theory of the course which includes:</p> <ul style="list-style-type: none"> - Short Answer Questions -Problem solving - Evaluation of theory elements <p>II. Examination in the laboratory part which is formed by:</p> <ol style="list-style-type: none"> 1. The participation of students in the laboratory: <ol style="list-style-type: none"> a) oral examination during the exercises (10%) b) evaluation of laboratory reports (10%) c) The average of the analysis results of unknown samples (20%) 2. The average of two (2) written exams (progress) (60%). <p>Students who achieve a grade greater than or equal to five (5) are exempt from the final exam. Otherwise they take the final exam in the laboratory part of the course which includes:</p> <ul style="list-style-type: none"> - Short answer questions - Multiple choice test 	

(5) ATTACHED BIBLIOGRAPHY

- Chemical Principles, Peter Atkins, Loretta Jones, Leroy Laverman, UTOPIA Publishing, 2018.
- PRINCIPLES OF ENVIRONMENTAL CHEMISTRY, James Girard, 3rd Edition, Parisian Scientific Publishing Company, 2015.
- BASIC LABORATORY KNOWLEDGE AND EXERCISE TECHNIQUES OF GENERAL AND INORGANIC CHEMISTRY, Violetta Konstantinou, Christos Pappas, Laboratory notes, Agricultural University of Athens, 2015.