

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Agricultural Sciences		
ACADEMIC UNIT	Biosystems & Agricultural Engineering		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	BAE_100	SEMESTER	1ST
COURSE TITLE	GENERAL AND INORGANIC CHEMISTRY		
INDEPENDENT TEACHING ACTIVITIES <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>		WEEKLY TEACHING HOURS	CREDITS
Lectures		3	
Tutorials		0	
Laboratory		2	
TOTAL		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>	Background (General Chemistry) Skills Development (Experimental General and Analytical Chemistry)		
PREREQUISITE COURSES:	There are no prerequisite courses.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek .-For Erasmus students in English		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)			

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><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"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i>
<p>The student, at the end of the relevant Learning Process, is able to:</p> <ul style="list-style-type: none"> • knows the structure of the individual • understands the placement of the elements in the Periodic Table and recognizes basic physical and chemical properties of the elements based on their position in the Periodic Table • understands chemical formulas and nomenclature of inorganic chemical compounds • recognizes the different categories of chemical reactions (transposition-redox) and expresses them comprehensively • performs stoichiometric calculations and correctly expresses the results • knows the safety rules of a chemical laboratory as well as to properly handle the basic utensils and instruments of a chemical laboratory • recognizes chemical reagents and understands how to handle them • prepares solutions and knows the ways of expressing their concentration • selects appropriate protolytic markers and performs pH calculations • applies the basic analytical techniques of Chemistry (volumetric analysis, gravimetric analysis, instrumental methods of chemical analysis)

- evaluates the results of a chemical analysis
- handles organology

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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At the end of this course the student will have further developed the following skills (general skills):

- Ability to identify and name utensils and instruments of a chemical laboratory
- Ability to record and keep a proper laboratory diary
- Ability to process experimental measurements and yield results in the correct format
- Ability to find information from any book of General and Analytical Chemistry as well as from sources on the internet

In general, upon completion of this course the student will have further developed the following general skills (from the list above):

Search, analysis and synthesis of data and information, using the necessary technologies

Adaptation to new situations

Decision making

Autonomous work

Teamwork

Respect for the natural environment

Exercise criticism and self-criticism

(3) SYLLABUS

1. Chemistry and measurements
2. Atoms, Molecules, Ions, Atomic and Molecular Structure, Periodic Table
3. Oxidation number, chemical bond, chemical formulas and nomenclature of simple chemical compounds
4. Solutions, Solubility, Standard Solutions
5. pH, Buffers
6. Chemical reactions, Chemical equations and stoichiometric calculations
7. Neutralization Reactions, Redox Reactions, Complexation Reactions, Precipitation Reactions
8. Qualitative Analysis, Analysis of the most important groups of cations and anions
9. Quantitative Analysis, Classification of methods of classical and instrumental quantitative analysis, Gravimetric analysis, Volumetric analysis,
10. Chromatography-Types of Chromatography, Electrochemical methods of analysis-Potentiometry,
11. Optical methods of analysis - Ultraviolet-visible absorption spectrophotometry, Infrared spectrophotometry,
12. Emission spectrophotometry, Atomic absorption
13. Repeat Summary

Laboratory Exercises

1. Introduction to the Laboratory-Safety and hygiene rules
2. Chemical Laboratory Utensils and Instruments

3. Chemical Reagents and their use
4. Basic Laboratory Techniques
5. Uncertainty of experimental measurements-Significant digits
6. Solution content
7. Dilution of Solutions
8. Sediment formation
9. Properties of metals and non-metallic elements
10. Indicators-Colorimetric determination of pH
11. Electrometric determination of pH-Use of pH-meter

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face to face deliveries. Laboratory exercises in General and Analytical Chemistry	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	<ul style="list-style-type: none"> • Use of ICT (power point) in Teaching • Use of ICT (power point) in Laboratory Training • Use of ICT in Communication with students (Learning process support through the electronic platform e-class). 	
TEACHING METHODS <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>	Activity	Semester workload
	Lectures	39
	Laboratory	26
	Writing short reports of laboratory exercises	13
	Final Exams	3
	Study hours and preparation for the laboratory exercises and the final examination	44
	Course total	125
STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure 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 Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	<ol style="list-style-type: none"> 1. The laboratories participate by 30% in the final grade. In order to be examined in theory, the student must have completed all the laboratories and have been successfully examined in them. 2. The main assessment criteria focus on understanding and correlating the knowledge that students gain from the course with other knowledge. Particular emphasis is placed on whether they have developed the ability to apply this knowledge to crop selection and to assess the impact of these changes on the environment. Emphasis is also placed on demonstrating critical ability and justifying the choices they make in each problem. 3. Evaluation is dynamic. It mainly involves problem solving. is done orally or in writing or with a combination of the two, with or without pre-examination on the basic principles of the course, with or without exculpatory advances and with other test or inventive methods, depending on the composition of the dynamics and the needs of the audience. 4. The above are done in the Greek language. For foreign language students (eg Erasmus students) conducted in English 	

(5) ATTACHED BIBLIOGRAPHY

1. D. D. Ebbing, S. D. Gammon, 2011. Γενική Χημεία, Εκδόσεις Τραυλός
2. D. A. Skoog, F. James Holler, T. A. Nieman, 2010. Αρχές Ενόργανης Ανάλυσης, Εκδόσεις Κωσταράκη
3. Σ. Λιοδάκης, 2001. Αναλυτική Χημεία, Εκδόσεις Παπασωτηρίου
4. Κ. Ξένος, 2006. Αναλυτική Χημεία, Μακεδονικές Εκδόσεις
5. ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΑΝΟΡΓΑΝΗ ΚΑΙ ΓΕΝΙΚΗ ΧΗΜΕΙΑ, (2η Έκδοση/2014), Νικόλαος Χατζηλιάδης, Διαθέτης (Εκδότης) UNIBOOKS IKE, ISBN: 9789609322072
6. Γενική Χημεία, 13η Έκδοση, Brown T., LeMay E., Burste B., Murphy C., Woodward P., Stoltzfus M., Εκδόσεις Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., ISBN:9789604185153

-Συναφείς επιστημονικές πηγές και περιοδικά:

- *Journal of Chemical Education* (ACS Publications) <http://pubs.acs.org/journal/jceda8>
- https://en.wikibooks.org/wiki/Introduction_to_Inorganic_Chemistry#Chapter_1:_Review_of_Chemical_Bonding
- http://library.aceondo.net/ebooks/Chemistry/General_Chemistry_9th-Ebbing.Gammon.pdfJournal of Cleaner Production, Conservation and Recycling, Waste Management