COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AY 103**	**SEMESTER**	**1st**
COURSE TITLE	**GENERAL CHEMISTRY**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**		**CREDITS**
Teaching Hours	5		5
COURSE TYPE	General background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_103		

(2) LEARNING OUTCOMES

Learning outcomes

The course provides students with the basic Chemistry background knowledge necessary to successfully attend a series of courses in the Department Study Programme. The course material aims to introduce students to basic concepts of the structure of atoms and the periodicity of their physical and chemical properties, the types of chemical bonds, the speed of chemical reactions and the factors that affect them, the physical state of matter and its relation to intramolecular and intermolecular forces, basic thermodynamic concepts and the study of complex compounds, solution chemistry, redox reactions and the electrochemical behaviour of solutions. The laboratory part of the course additionally enables students to develop laboratory skills and acquire laboratory experience and knowledge. Upon successful completion of the course, students will have acquired specific knowledge, skills and competences and will be able to:

- Understand basic concepts of Chemistry which are presented in the course.
- Apply the knowledge acquired to courses of the following semesters, related to Biology, Geology, etc.
- Meet the requirements of "Good Laboratory Practice".
- Evaluate, analyze and calculate laboratory measurement data and write laboratory reports.
- Apply the knowledge acquired in the course to solve environmental problems.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- 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 the natural environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

- States of matter, chemical reactions, chemical equations and stoichiometry
- Structure of the Atom. Periodic Table of the Elements, Chemical bonds Atomic and molecular
- C atom – hybridization
- Molecular forces

- Redox – Electrochemistry
- Elements of chemical thermodynamics
- Solutions and colloidal dispersion systems
- Elements of chemical kinetics
- Chemical balance
- Balance of weak bases and acids. Ionization of water. pH concept and measurement
- Clustering compounds

Laboratory Exercises:
Utensils – Materials – Reagents – Laboratory Safety. Laboratory techniques. Analytical balance – Processing of experimental measurement results. Density measurement. Statistical analysis. Solutions: preparation and dilution of solutions from concentrated solution and solid substances. Solution titration – Reaction stoichiometry. Colloidal solutions. Phase separation – Sample drying. Chemical kinetics – Measurement of reaction rate. Chemical Equilibrium. Heat of reaction.

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	• Use of PowerPoint slides • View material in video • Communication with students via e-mail • Use of asynchronous distance learning (e-class)
TEACHING METHODS	

Activity	***Semester workload***
Lectures	26
Seminars	13
Laboratory practice	26
Fieldwork	2
Study and analysis of bibliography	45
Educational visits	13
Course total (25 hours workload per credit)	**125**

STUDENT PERFORMANCE EVALUATION	Students' performance is evaluated in the Greek language. The final grade is determined by: • A written exam (at the end of the semester) that contributes 70% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving. • A laboratory grade that contributes 30% to the final grade. Laboratory practice is evaluated by: (i) the completion of the laboratory exercises, (ii) the delivery of a written assignment for each laboratory exercise (A) that contributes 20% to the laboratory grade, (iii) a written exam (B) that contributes 80% to the laboratory grade. **Laboratory Grade: 20% (A) + 80% (B)** **Final Grade = 70% Exam Grade + 30% Laboratory Grade**

(5) ATTACHED BIBLIOGRAPHY

- Girard, James E. (2015) *Principles of Environmental Chemistry*, (3rd Edition). Athens: Parisianou Publishers. (in Greek)
- Konsolakis, I. M. (2008) *General Chemistry-Theory & Applications*, (2nd edition). Athens: Aenaos Publishers. (in Greek)
- Konstantinou, V. & Pappas, Ch. (2015) *Basic Laboratory Knowledge and Exercise Techniques of General and Inorganic Chemistry*. Laboratory notes, Agricultural University of Athens. (in Greek)