



Course Syllabus

Course Code	Course Title	ECTS Credits
CHEM-121	Environmental Chemistry	5
Prerequisites	Department	Semester
None	Life & Health Sciences	Fall, Spring
Type of Course	Field	Language of Instruction
Required	Chemistry	English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Angelos Dados	1 st
Mode of Delivery	Work Placement	Corequisites
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- To give students an introduction to the principles of general, physical, analytical and organic chemistry required to assist with understanding of the chemical processes important for the environment.
- To develop understanding of the terrestrial atmosphere and the basic chemical reactions that lead to air pollution in the troposphere.
- To develop understanding of the sources of water on earth, and to develop awareness of the chemical pollutants of terrestrial water.
- To help in the acquisition of sound hands-on practical skills in the chemistry lab.

Learning Outcomes:

After completion of the course students are expected to be able to:

- Explain atomic and molecular structure and discuss the arrangement of atoms or molecules in different forms of matter.
- Utilize qualitatively and quantitatively chemical equations for a variety of chemical reaction types.
- List different types of organic compounds and their chemical reactions.
- Use the basic tools of analytical chemistry to evaluate pollution levels.

- Explain the importance of water in maintaining life on earth and the different means of water pollution in lakes, rivers, and oceans.
- Explain the structure of the terrestrial atmosphere and explain the principal means of pollution in the troposphere and the depletion of ozone in the stratosphere by halogenated compounds.
- Explain the principal means of soil pollution.

Course Content:

1. Measurements, Units and Conversions
2. Atomic Theory
3. Chemical Bonding
4. Chemical Equations
5. Methods of Chemical Analysis
6. Organic Functional Groups
7. The Terrestrial Atmosphere
8. Natural and Anthropogenic Air Pollution
9. Terrestrial Sources of Water
10. Water and Soil Pollution

Laboratory Experiments, Demonstrations and Workshops:

1. Laboratory Safety Demonstrations
2. Spectrophotometric Methods of Chemical Analysis
3. Volumetric Analysis: Acid-Base Reactions
4. pH and Buffers
5. Methods of Separation
6. Gravimetric Analysis of Seawater and Drinking Water
7. The Detection and Measurement of Benzene in Drinking Water
8. The Effects of Acid Rain on Structural Materials
9. Detection of Metal Ions by Flame Color

Learning Activities and Teaching Methods:

Lectures, Laboratory Practical Sessions, and Assignments.
The course format is 3 h lectures and 1 h laboratory tutorial session per week.

Assessment Methods:

Homework, Laboratory Practical Sessions, mid-term exam, final exam.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
An Introduction to Environmental Chemistry	J.E. Andrews, P. Brimblecombe, T.D. Jickells, P.S. Liss, B. Reid	Wiley-Blackwell	2003	978-06320590

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Fundamentals of General, Organic, and Biological Chemistry	J.E. McMurry, D.S. Balantine, C.A. Hoeger, V.e. Peterson, M.E. Castellion	Prentice Hall	2012	0203966090
General Chemistry Principles and Modern Applications	R.H. Petrucci, W.S. Harwood, and F.G.Herring	Prentice Hall	2002	0130143294