

ECTS

(B) Course information in english

General course information:

Course title:	Aquatic Chemistry and Water Treatment	Course code:	YΔ1220
Credits:	5	Work load (hours):	90
Course level:	Undergraduate ☐☐	Graduate	☐☐
Course type:	Mandatory ☐☐	Selective	☐☐
Course category:	Basic ☐☐	Orientation	☐☐
Semester:	8th	Hours per week:	4
Course objectives (capabilities pursued and learning results):			
<p>The course covers the basic principles of aquatic chemistry and provides the necessary—from an environmental point of view—knowledge of how the chemical composition of natural waters varies, in order to not only define their quality for some use, but also in order to comprehend many of the natural and artificial processes that involve the aquatic phase. Since many of the water quality criteria concern dissolved chemical species, the mechanisms of chemical species integration in the water phase are examined.</p>			
Prerequisites:			

Instructor's data:

Name:	Chrysi Laspidou
Level:	Professor
Office:	Civil Engineering Faculty University of Thessaly Pedion Areos, 38334 Volos, Greece
Tel. – email:	+30 24210 74147 – Laspidou@uth.gr
Other tutors:	-

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Introduction: principles of inorganic chemistry, chemical species, molecular weights, red-ox reactions, gram-equivalents	4	1
2	Introduction: properties of water, composition of several types of water, methods of expressing concentration	4	1
3	Chemical kinetics: rates, reaction orders, reaction mechanisms, catalysis	4	1
4	Chemical equilibrium: thermodynamic basics, equilibrium constant calculation	4	1
5	Problems on the material covered in weeks 1 to 4.	4	1
6	Acid base chemistry: Definition of terms, introduction, reaction rates	4	1
7	Acid-base chemistry: Equilibrium calculations, mass balances, proton condition	4	1
8	Acid-base chemistry: Graphical procedure for equilibrium calculations, pC-pH diagrams	4	2
9	Acid-base chemistry: several cases combinations of strong/weak acid and strong/weak base	4	2
10	Problems on the material covered in weeks 6 to 9.	4	2
11	Complexation chemistry: Equilibrium constants, distribution diagrams	4	2
12	Precipitation-dissolution: Kinetics calculations, Equilibrium calculations	4	2
13	Precipitation-dissolution: Solubility of salts, common ion effect, carbonate solubility	4	2

Additional hours for:			
Class project	Examinations	Preparation for examinations	Educational visit
		13	

Suggested literature:

Water Chemistry, by V.L. Snoeyink and D. Jenkins, J. Wiley & Sons

Aquatic Chemistry: An Introduction Emphasizing Chemical Equilibria in Natural Waters, by W. Stumm and J.J. Morgan, J. Wiley & Sons

Other books in Greek

Teaching method (select and describe if necessary - weight):

Teaching	☐☐	.60...%
Seminars	☐☐%
Demonstrations	☐☐%
Laboratory	☐☐%
Exercises	☐☐40...%
Visits at facilities	☐☐%
Other (describe):	☐☐%
Total		100%

Evaluation method (select)- weight:

	<u>written</u>	<u>%</u>	<u>Oral</u>	<u>%</u>
Homework	☐☐		☐☐	
Class project	☐☐		☐☐	
Interim examination	☐☐		☐☐	
Final examinations	☐☐	100	☐☐	
Other (describe):	☐☐		☐☐	