SUBJECT TEACHING GUIDE

694 - Chemistry

Master's Degree in Environmental Engineering and Management

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Master's Degree in Environmental Engineering and Management			Type and Year	Optional. Year 1
Faculty	School of civil Engineering				
Discipline	Complement in Training				
Course unit title and code	694 - Chemistry				
Number of ECTS credits allocated	3	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DEL AGUA Y DEL MEDIO AMBIENTE
Name of lecturer	ANA LORENA ESTEBAN GARCIA
E-mail	analorena.esteban@unican.es
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 2. DESPACHO PROFESOR (2031)
Other lecturers	MARIA LUISA PEREZ GARCIA XABIER EDUARDO MORENO-VENTAS BRAVO MARIA CARMEN GOMEZ NAVAZO

3.1 LEARNING OUTCOMES

- - Associate different concentration units to air, water and waste samples, and carry out transformations with molar units, in volume and weight.
- Adjust simple chemical reactions and perform stoichiometric calculations.
- Identify the energy changes that occur in chemical processes and calculate them numerically taking into account the physical state of reactants and products.
- Quantify the reaction rate and predict the reaction mechanism based on experimental data.
- Describe quantitatively and qualitatively the chemical balance and the effect of external factors on it .
- Apply criteria of spontaneity and balance to interpret where simple chemical reactions will evolve.

- - Identify substances as acids or bases and use the acidity and basicity constants to calculate concentrations and pH.
- Predict whether the mixture of two solutions will cause the appearance of a precipitate.
- Use the tables of normal potentials to determine the spontaneity of a redox reaction.
- Name and formulate simple organic compounds and classify complex organic compounds.

4. OBJECTIVES

- Understand the basic concepts of Chemistry that allow a guaranteed understanding of the various subjects that make up Environmental Engineering.
- Apply the knowledge acquired to solving problems, with special emphasis on those of Environmental Engineering

6. COURSE ORGANIZATION

CONTENTS	
1	Chemical balance. Acid-Base Reactions. Precipitation Reactions
2	Precipitation Reactions. Organic chemistry
3	Chemical reactions. Solutions Chemical kinetics and thermodynamics

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam	Written exam	Yes	Yes	55,00
Practical cases	Work	No	Yes	45,00
TOTAL				100,00

Observations

Observations for part-time students

The evaluation criteria are the same as for full-time students

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

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- CHANG R. Y GOLDSBY K.A. (2017) ”Química” ISBN 978-0-07-802151-0
- DOMÉNECH, X. (2004). “Química Ambiental." Miraguano Ediciones, Madrid.
- GARCÍA, J.A. y otros. (2019)." Química: Teoría y Problemas". Ed. Tebar Flores
- MANAHAN,S.E. (2012). "Enviromental Chemistry." Lewis Publishers. Florida.
- MASTERS, G. Y ELA, W. (2008) “Introducción a la ingeniería medioambiental”. Pearson.
- HAUSER, B.A. (2006) "Practical Manual of Wastewater Chemistry"
- HOWARD, A.G. "Aquatic Environmental Chemistry" ISBN: 0-19.850283-4
- PETERSON, W. Nomenclatura de Química Inorgánica (IUPAC). Edit. EUNIBAR
- RAISWELL, R.W.; BRIMBLECOMBE, P.; DENT, D.L.; LISS, P.S. (2003). "Química Ambiental" Ediciones Omega S.A., Barcelona
- REBOIRAS, M.D. (2006) “Química. La ciencia básica.” Ed.Thomson
- SAWYER,C.N.; McCARTY, P.L. (2014). "Chemistry for Environmental Engineering" Mcgraw-Hill Book Company. Nueva York.
- SCHWARZENBACH, R.P. "Environmental Organic Chemistry" ISBN: 0-471-83941-8
- SCHWARZENBACH, R.P. (2013) "Environmental Organic Chemistry: illustrative examples, problems and case studies"
- SNOEYINK, V.L.; JENKINS, D. (2010). "Química del agua" Editorial Limusa, México D.F.
- STUMM, W.; MORGAN, J.J. (1995) "Aquatic Chemistry" Wiley Interscience.