



Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 271110 **Name:** Chemistry of Aqueous Solutions

Credits: 6,00 **ECTS Year:** 1 **Semester:** 2

Module: Fundamental Science

Subject Matter: Chemistry **Type:** Basic Formation

Field of knowledge: Sciences

Department: -

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

271A

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Module organization

Fundamental Science

Subject Matter	ECTS	Subject	ECTS	Year/semester
Physics	12,00	Fluid Mechanics	6,00	1/2
		Physics	6,00	1/1
Mathematics	6,00	Mathematics	6,00	1/1
Chemistry	12,00	Chemistry	6,00	1/1
		Chemistry of Aqueous Solutions	6,00	1/2
Biology	12,00	Biochemistry	6,00	1/2
		Biology	6,00	1/1
Geology	6,00	Geology	6,00	1/2

Recommended knowledge

General Chemistry
General Physics



Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student is able to understand and assimilate the concepts included in the syllabus of the subject.
- R2 The student is able to solve problems related to the contents of the subject by using different resources.
- R3 The student is able to work in a chemistry laboratory performing basic operations correctly and observing the relevant safety regulations.
- R4 The student is able to understand correctly the planning of a practical laboratory experience, as well as its development, purpose and interpretation of the results.
- R5 The student uses language appropriately, both in general writing and in the presentation of data.
- R6 The student collaborates with his/her teacher and classmates during the learning process.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

BASIC		Weighting			
		1	2	3	4
CB1	Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area.			X	
CB2	Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study.				X
CB5	Students develop the necessary learning skills to undertake further studies with a high level of autonomy.			X	

GENERAL		Weighting			
		1	2	3	4
CG1	Capacity to analyze and synthesize			X	
CG2	Capacity to organize and plan			X	
CG3	Mastering Spanish oral and written communication			X	
CG5	Knowing and applying Basic ITC skills related to marine science			X	
CG6	Capacity to manage information (capacity to look for and analyze information coming from different types of sources)			X	
CG7	Decision making			X	
CG8	Capacity to work in interdisciplinary and multidisciplinary team			X	
CG9	Interpersonal skills			X	



CG10	Critical and self-critical capacity	x		
CG11	Capacity to learn			x
CG12	Capacity to adapt to new situations	x		
CG13	Capacity to produce new ideas (creativity)	x		
CG16	Capacity to apply theoretical knowledge			x

SPECIFIC	Weighting			
	1	2	3	4
CE8	Identifying and analyzing new problems and proposing solution strategies			x
CE9	Knowing how to carry out experiments and measurements both in the laboratory and during sample collection			x
CE11	Knowing how to do fieldwork and laboratory experiments in a safe and responsible way, promoting teamwork			x



Assessment system for the acquisition of competencies and grading system

Assessed learning outcomes	Granted percentage	Assessment method
	70,00%	Written test with theoretical and practical questions
	10,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
	10,00%	Laboratory test
	10,00%	Oral presentation

Observations

The written test takes place on the day and at the time stipulated in the official announcement of the final exam. A minimum grade of 4.0 out of 10 is required in order to be able to average with the rest of the elements. The works consist of the delivery of the notebook of problems and the delivery of the laboratory fact sheets. The practical laboratory test is carried out on the day and at the time stipulated in the official announcement of the final examination. A minimum grade of 4.0 out of 10 is required to be able to average. Attendance to Laboratory Practices is obligatory. Only one absence to the laboratory is admitted, as long as it is duly justified. The presentation of papers will be based on the Calpe project.

MENTION OF DISTINCTION:

According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.



Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.
- M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.
- M3 Activities carried out in spaces with specialized equipment.
- M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.
- M8 Set of oral and/or written tests used in initial, formative or additive assessment of the student.
- M9 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es)
- M10 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es).



IN-CLASS LEARNING ACTIVITIES

	LEARNING OUTCOMES	HOURS	ECTS
ON-CAMPUS CLASS M1	R1, R4, R5	40,00	1,60
PRACTICAL CLASSES M2	R1, R4, R5	5,00	0,20
LABORATORY M3	R1, R2, R3, R4, R5, R6	10,00	0,40
TUTORIAL M6	R1, R5	3,00	0,12
ASSESSMENT M8	R1, R2, R3, R4, R5	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R1, R2, R3, R4, R5	20,00	0,80
INDEPENDENT WORK M10	R1, R3, R4	70,00	2,80
TOTAL		90,00	3,60



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

Content block	Contents
THERMODYNAMICS	Thermochemistry Conditions of spontaneity and balance
LIQUIDS AND DISSOLUTIONS	Solutions Colligative properties
BALANCING PHASES. REAL SOLUTIONS	Balancing phases in single-component systems and binary systems Chemical balance Real solutions
KINETICS	Chemical reaction rate Complex reactions Molecular kinetics Catalysis and photochemistry
LABORATORY	Measurement of the enthalpy of dissolution of benzoic acid. Colligative properties. Solute concentration effect Kinetic study of the hydrolysis of an ester Kinetic study of the discoloration of phenolphthalein by spectrophotometry. Catalysis.



Organization of the practical activities:

	Content	Place	Hours
PR1.	Seminar foundation and calculations of the practices: Measurement of the enthalpy of dissolution of benzoic acid and Kinetic study of the discoloration of phenolphthalein by spectrophotometry.	Lecture room	2,00
PR2.	Measurement of the enthalpy of dissolution of benzoic acid.	Laboratory	2,00
PR3.	Kinetic study of the discoloration of phenolphthalein by spectrophotometry.	Laboratory	2,00
PR4.	Seminar foundation and calculations of the practices: Catalysis and kinetic study of the hydrolysis of an ester. Colligative properties. Solute concentration effect.	Lecture room	2,00
PR5.	Catalysis	Laboratory	2,00
PR6.	Kinetic study of the hydrolysis of an ester. Colligative properties.	Laboratory	2,00
PR7.	Taking samples to determine physical-chemical parameters	Marine station	1,00
PR8.	Determination of physicochemical parameters in marine samples	Laboratory	2,00



Temporary organization of learning:

Block of content	Number of sessions	Hours
THERMODYNAMICS	6,00	12,00
LIQUIDS AND DISSOLUTIONS	3,00	6,00
BALANCING PHASES. REAL SOLUTIONS	10,00	20,00
KINETICS	6,00	12,00
LABORATORY	5,00	10,00

References

REFERENCES

Físico-Química. Atkins P. W. Ed. Addison-Wesley Iberoamericana, 1986
Química Física. Díaz- Peña M., Roig Muntaner. Ed. Alambra, 1983
Manual de Termodinámica. Gandía V. Ed. Universitat de Valencia, 1995
Físicoquímica para farmacia y biología. Sanz Pedrero, P. Ed. Masson-Salvat, 1992
Problemas de Físicoquímica. Levine I. N., Ed. McGraw-Hill, 2005
Introducción a la Físicoquímica. J.L. Moreno Frigols, R.García Doménech, G.Antón Fos.
Universitat de València, 2011

COMPLEMENTARY REFERENCES

Química general. R.H. Petrucci, W.S. Harwood y F. G. Herring. Ed. Prentice Hall, 2003.
Química. R. Chang. Ed. Mc Graw-Hill, 1997.
Química principios y reacciones. W. I. Masterton y C.N. Hurley. Ed. Thomson. Paraninfo, 2003.
Fundamentos de fisicoquímica. S.H. Maron y C.F. Prutton. Ed. Limusa, 1998.
Química curso universitario. B.M. Mahan y R.J. Myers. Ed. Addison-Wesley Iberoamericana, 1990.
Química general. J.B. Umland y J.M. Bellana, Ed. Thomson, 1999.



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☐ Kaltura

Explanation about the practical sessions:

Las sesiones de las prácticas de laboratorio se realizarán de forma no presencial, utilizando las herramientas de Teams y UCVNet, a través de seminarios sobre el fundamento teórico y el tratamiento de datos.



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

Course guide		Adaptation	
Assessment tool	Allocated percentage	Description of the suggested changes	Platform to be used

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: