



Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 271109 **Name:** Chemistry

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

Module: Fundamental Science

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

Field of knowledge: Sciences

Department: Basic and Cross-disciplinary Sciences

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

271A

Ana Maria Hernandez Martinez (**Responsible Lecturer**)

am.hernandez@ucv.es



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

Chemistry (High School level).



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
R1, R2, R6	65,00%	Written test with theoretical and practical questions
R1, R2, R5, R6	15,00%	Delivery of guided assignments, whose objectives and contents will be proposed by the teacher
R1, R2, R3, R4, R5	10,00%	Laboratory test
R1, R2, R5, R6	10,00%	Oral presentation

Observations

According to the general evaluation and qualification regulations, the preferred evaluation system will be by means of continuous evaluation.

A minimum grade of 5 points out of 10 is required in the written test and the practical laboratory test in order to be able to average with the rest of the grades and pass the course. The written test is broken down into (a minimum grade of 5 out of 10 is required in each of the parts in order to be able to average):

- Theoretical questions 30%.
- Practical questions (problems) 35%. The continuous evaluation will be applied to the realization of problems during the course of the syllabus.

The "laboratory test" consists of a laboratory practice. Attendance to laboratory laboratory is compulsory. Only 1 absence from the laboratory is allowed, provided that it is justified. The teacher will keep track of attendance. The unjustified absence to a practical, will suppose a penalty of 10% in the score of the practical exam. The absence unjustified absence to all the practices, will suppose a penalty of 50% in the score of the practical exam. The absence to more than one practical, without reaching the totality of them, will be studied individually to choose the penalty at the discretion of the teacher.



MENTION OF DISTINCTION:

In accordance with the regulations governing the assessment and grading of subjects in force at UCV, the distinction of "Matrícula de Honor" (Honours with Distinction) may be awarded to students who have achieved a grade of 9.0 or higher. The number of "Matrículas de Honor" (Honours with Distinction) may not exceed five percent of the students enrolled in the group for the corresponding academic year, unless the number of enrolled students is fewer than 20, in which case a single "Matrícula de Honor" (Honours with 9 Distinction) may be awarded. Exceptionally, these distinctions may be assigned globally across different groups of the same subject. Nevertheless, the total number of distinctions awarded will be the same as if they were assigned by group, but they may be distributed among all students based on a common criterion, regardless of the group to which they belong. The criteria for awarding "Matrícula de Honor" (Honours with Distinction) will be determined according to the guidelines stipulated by the professor responsible for the course, as detailed in the "Observations" section of the evaluation system in the course guide.

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, R2, R5, R6	40,00	1,60
PRACTICAL CLASSES M2	R1, R2, R4, R5, R6	5,00	0,20
LABORATORY M3	R3, R4, R5, R6	10,00	0,40
TUTORIAL M6	R1, R2, R5, R6	3,00	0,12
ASSESSMENT M8	R1, R2, R3, R4, R5, R6	2,00	0,08
TOTAL		60,00	2,40

LEARNING ACTIVITIES OF AUTONOMOUS WORK

	LEARNING OUTCOMES	HOURS	ECTS
GROUP WORK M9	R4, R5, R6	20,00	0,80
INDEPENDENT WORK M10	R1, R2, R3, R6	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
Practical Contents	Laboratory and Boat hours.
Unit 2- Structure of the atom	<p>Introduction to General Chemistry.</p> <ol style="list-style-type: none">2. Models of atom structure: Thomson Model, Rutherford.3. Bohr model.4. Sommerfeld model.5. Principles of Quantum Mechanics6. Schrödinger's equation.7. Atomic orbital and electronic configuration
Unit 3: Chemical Periodicity and the Periodic Table	<ol style="list-style-type: none">1. Triads of Döbereiner's Triads. Newlands' Octaves, Mendeleev and Meyer, Moseley.2. Periodic Properties: electrical conductivity, atomic and ionic radii, ionization potential, electronic affinity, electronegativity.
Unit 4: The Chemical Link	<ol style="list-style-type: none">1. Lewis' structures.2. The Ionic bond. Properties of ionic compounds.3. The Covalent bond. Properties of covalent compounds.4. The Molecular Orbital Theory. Molecular Orbital Diagrams (MOM)5. The metallic bond.



Unit 5: The Chemical Balance

1. Balance constant. Le Chatelier's Principle.
 2. Spontaneity of a process.
 3. Speed of reaction.
 4. Acid-base equilibrium, pH, buffer solution.
 5. Redox equilibrium. Batteries. Corrosion.
 6. Solubility equilibrium. Factors affecting solubility
 7. Complexes. Structure and link. Factors affecting stability.
- Formation balances.

Organization of the practical activities:

	Content	Place	Hours
PR1.	Concept of salinity, pH and dissolved oxygen. Sampling instruments: Niskin bottle and water analysis: salinometer, pH Meter and oximeter.	Boat	2,00
PR2.	Preparation of solutions, obtaining and separation of precipitates	Laboratory	2,00
PR3.	Acid-base balances. pH measurement.	Laboratory	2,00
PR4.	Determination of suspended solids.	Marine station	2,00
PR5.	Colorimetry. Lamber Beer's Law.	Laboratory	2,00



Temporary organization of learning:

Block of content	Number of sessions	Hours
Practical Contents	5,00	10,00
Unit 2- Structure of the atom	5,00	10,00
Unit 3: Chemical Periodicity and the Periodic Table	5,00	10,00
Unit 4: The Chemical Link	5,00	10,00
Unit 5: The Chemical Balance	10,00	20,00

References

- “Química Inorgánica”, D:F: SHIVER, P.W. ATKINS Y C.H. LANGFORD. Ed. Reverté (1998)
- “Química” (6ª edición), R.CHANG. Ed. Mc Graw-Hill (1999)
- Los Elementos y Moleculas de la vida” Introducción a la Química Biológica y Biología Molecular. 2ª Parte.LOSADA M., VARGAS M.A. Ed. Rueda.
- “Química”. Curso Universitario. MAHAN B.H. Ed. Fondo Educativo Interamericano.
- “Química Genera”l. Equilibri i canvi. OLBA A. Ed. PUV
- “Química” Un proyecto de la ACS. FREEMANN W. H. Ed.Reverté
- “Química Inorgánica”, E. GUTIÉRREZ RIOS. Ed. Reverté, (1978).
- “Química Inorgánica”, A.G. SHARPE, Ed. Reverté, (1998).
- “Química Inorgánica avanzada”, F.A. COTTON, G.WILKINSON, Ed. Wiley, (1986).
- “Seawater: Its composition, properties and behaviour”, J.BROWN, A. COLLIG, D. PARK, J.
- “Curso práctico de química orgánica”, R.Q. BREWSTER, C.A. VAN DER WERF Y W.E. MC EWEN. Ed. Alhambra.
- “Química Orgánica”, K.P.C. VOLHARDT, Ed. Omega (1990)
- “Química Orgánica”(9ª edición), H.HART, D.J. HART Y L.E. CRAINE, Ed. Mc Graw-Hill (1995).
- “Métodos de laboratorio para química orgánica”, R. KEESE, R.K. HÜLLER Y T.P. TOUBE. Ed. Limusa.